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PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME XXVIII

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TABLE OF CONTENTS

Officers and Committees for 1915 iii
Proceedings for 1915 ix
First List of the Fishes of the Vicinity of Plummers Island, Maryland, by W. L. McAtee and A. C. Weed 1–14
The Water Shrew of Nova Scotia, by Glover M. Allen 15–18
Proposal of New Muscoid Genera for Old Species, by Charles H. T. Townsend 19–24
Andropogon halepensis and *Andropogon sorghum*, by Charles V. Piper 25–44
Four New North American Diptera, by J. R. Malloch 45–48
A Remarkable New Thrips from Australia, by J. Douglas Hood 49–52
An Outline of the Subfamilies and Higher Groups of the Insect Order Thysanoptera, by J. Douglas Hood 53–60
The Variations of a Brood of Watersnakes, by E. R. Dunn . . 61–68
General Notes 69–70
Determination of *Vesperugo ragans* Dobson from "Bermuda," by Oldfield Thomas, 69; The Generic Name *Connochætes* of Lichtenstein, by Oldfield Thomas, 69; The Type Locality of *Pecari tajacu*, by N. Hollister, 70; A New Name for the White-tailed Jack Rabbit, by N. Hollister, 70.
Recent Notes Regarding West Indian Reptiles and Amphibians, by T. Barbour 71–78
Preliminary Diagnoses of Apparently New South American Birds, by W. E. Clyde Todd 79–82
Two New Species of *Pipunculus*, by Frederick Knab 83–86
A New Species of *Achyranthes* from Tobago, by Paul C. Standley 87–88
Notes on the Sharks and Rays of Cape Lookout, N. C., by Russell J. Coles 89–94
New Fresh-Water Crabs (*Pseudothelphusa*) from Colombia, by Mary J. Rathbun 95–100
A New Spider Monkey from Panama, by E. A. Goldman . . . 101–102
Description of a New Bob-white from Colorado, by F. C. Lincoln 103–104
Descriptions of some New Forms of American Cuckoos, Parrots, and Pigeons, by Robert Ridgway 105–108
Descriptions of a New Genus and Seven New Races of Flying Squirrels, by Arthur H. Howell 109–114
A New Squirrel from Northeastern China, by Gerrit S. Miller, Jr. 115–116
New Species of Decapod Crustaceans from the Dutch West Indies, by Mary J. Rathbun 117–120
A New *Turnagra* from Stephens' Island, New Zealand, by J. H. Fleming 121–124
Three New Subspecies of Birds from Eastern Mexico and Yucatan, by Outram Bangs 125–126

Five New Rice Rats of the Genus *Oryzomys* from Middle America, by E. A. Goldman 127–130
A New Species of Tailless Batrachian from North America, by Leonhard Stejneger 131–132
Five New Mammals from Mexico and Arizona, by E. A. Goldman 133–138
A New Pigeon from Chiriqui, Panama, by Robert Ridgway . . 139–140
General Notes 141–144
Eureodon as the Generic Name of the Warthogs, by M. W. Lyon, Jr., 141; *Jacquinotia*, a New Crab Name, by Mary J. Rathbun, 142; The Systematic Name of the Mexican Spider Monkey, by N. Hollister, 142; The Name of Azara's Agouarachay, by Wilfred H. Osgood, 142-143.
The Status of the Tunicate Genera *Appendicularia* and *Fritillaria*, by Paul Bartsch 145–146
Diagnosis of a New Subspecies of Marmot from Colorado, by J. D. Figgins 147–148
A New Snake from Southern Peru, by Thomas Barbour 149–150
Scales of Panama Fishes, by T. D. A. Cockerell 151–160
Descriptions of Three New Birds from China and Japan, by J. H. Riley 161–164
New Genera and Species of Acocephalinæ, by E. D. Ball . . . 165–168
Preliminary Diagnoses of Seven Apparently New Neotropical Birds, by W. E. Clyde Todd 169–170
A New Species of *Iresine* from the United States, by Paul C. Standley 171–174
An Anatomical Note on the Genus *Chordeiles* Swainson, by Alex Wetmore 175–176
A New Pigeon from Jamaica, by Robert Ridgway 177–178
General Notes 179–184
Macaca versus *Pithecus* as the Generic Name of the Macaques, by M. W. Lyon, Jr., 179; *Cymopolia* versus *Palicus*, by Mary J. Rathbun, 180; Notes on Several Preoccupied Generic Names (Aves), by Charles W. Richmond, 180; *Grossularia marcescens*, by Frederick V. Coville, 181; *Phacochœrus* as the Generic Name of the Warthogs, by Oldfield Thomas, 181; Note on a New Zealand Grass, by A. S. Hitchcock, 182; A Note on the Occurrence of *Epiperipatus imthurmi* (Sclater), by Austin H. Clark, 182; Note on the Generic Name *Bolborhynchus* Bonaparte, by Chas. W. Richmond, 183; Note on *Chlorostilbon puruensis*, by J. H. Riley, 183; The Specific Name of the Striped Muishond of South Africa, by N. Hollister, 184.

PLATES.

I. Facing p. 14. Map of Potomac River, Great Falls to Little Falls.

II. Facing p. 14. *Hypentelium nigricans*, showing position of fins.

III. Facing p. 85. *Pipunculus industrius* and *P. vagabundus*.

The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The index, title page, and minutes of meetings for 1915 (pp. i–xiv, 185–189) were issued on January 25, 1916.

Vol. XXVIII, pp. ix–xiv

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets in the Assembly Hall of the Cosmos Club on alternate Saturdays at 8 P. M.

January 9, 1915—533d Meeting.*

President Paul Bartsch in the chair and 40 persons present.

Dr. L. O. Howard made remarks on meetings of the American Association for the Advancement of Science lately held in Philadelphia.

Dr. H. A. Pilsbry discussed certain aspects of Hawaiian land shell problems.

The regular program consisted of three communications, as follows:

"An Unknown Fossil"; William Palmer.

"An Albino Diamond-back Terrapin"; W. P. Hay.

"Notes on the Physiology of Bats"; M. W. Lyon, Jr.

January 23, 1915—534th Meeting.†

President Bartsch in the chair and 75 persons present.

Dr. Johan Hjort, Director of Fisheries of Norway, discussed Norwegian herring catches.

Lantern slides on biological subjects were exhibited by W. W. Cooke, Hugh M. Smith, William Palmer, and Paul Bartsch.

The regular program consisted of a single paper, as follows:

"Developing Instincts of a Young Squirrel"; Agnes Chase.

*Abstracts of papers in Journ. Washington Acad. Sci., Vol. 5, pp. 290–291, April 19, 1915; and in Science, N. S., Vol. 41, p. 477, March 26, 1915.

†Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 290–291, April 19, 1915; and in Science, N. S., Vol. 41, p. 478, March 26, 1915.

February 6, 1915—535th Meeting.*

Vice-President A. D. Hopkins in the chair and 35 persons present.

Dr. B. H. Ransom called attention to a new biological journal devoted to animal parasites.

Prof. W. W. Cooke read a brief letter from Dr. B. W. Evermann of San Francisco.

The program consisted of two communications, as follows:

"Remarks on the Rate of Growth of Stony Corals"; T. Wayland Vaughan.

"Botanical Explorations in South America"; J. N. Rose.

February 20, 1915—536th Meeting.†

President Bartsch in the chair and 65 persons present.

Gen. T. E. Wilcox made inquiries concerning the color of the eyes of certain turtles.

Dr. L. O. Howard discussed the mosquito campaign in New Jersey.

Mr. William Palmer exhibited the tip of the tongue of a sulphurbottom whale.

One communication was presented for the regular program;

"A Naturalist in Nevada"; H. C. Oberholser.

March 6, 1915—537th Meeting.‡

Ex-President Leonhard Stejneger in the chair and 60 persons present.

Prof. A. S. Hitchcock called attention to the preparation of a new Flora of the District of Columbia.

Two communications were presented:

"Notes on the Possible Origin of the Bears"; J. W. Gidley.

"The Evolution of the Horse"; H. K. Bush-Brown.

March 20, 1915—538th Meeting.§

President Bartsch in the chair and 45 persons present.

* Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 291–292, April 19, 1915; and in Science, N. S., Vol. 41, p. 551, April 9, 1915.

† Abstracts in Journ. Washington Acad. Sci., Vol. 5, p. 292, April 19, 1915; and in Science, N. S., Vol. 41, p. 552, April 9, 1915.

‡ Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 333–334, May 4, 1915; and in Science, N. S., Vol. 41, p. 587, April 16, 1915.

§ Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 334–335, May 4, 1915; and in Science, N. S., Vol. 41, p. 664, April 30, 1915.

Gen. T. E. Wilcox called attention to a Cedar of Lebanon in Lafayette Square.

Three communications were presented:

"Notes on the Importation of Foreign Birds"; T. S. Palmer.

"Notes on the Breeding of Minks in Captivity"; Ned Dearborn.

"*Endamoeba gingivalis* and Pyorrhea"; M. W. Lyon, Jr.

April 3, 1915—539th Meeting.*

President Bartsch in the chair and 65 persons present.

Dr. L. O. Howard called attention to a curious wasp's nest.

Doctors Bartsch and Lyon made remarks on the red-headed woodpeckers in the grounds of Freedmen's Hospital.

Dr. Bartsch and Mr. Vernon Bailey made remarks on the gray squirrels in the city parks.

Two communications were presented:

"The Snakes and Lizards of Okefinoke Swamp"; A. H. Wright.

"The Birds of a Cat-tail Marsh"; Arthur A. Allen.

April 17, 1915—540th Meeting.†

Vice-President J. N. Rose in the chair and 50 persons present.

Dr. L. O. Howard discussed the novel breeding habits of certain mosquitos in the mountains of New York.

Three communications were presented:

"Some Features in the Morphology of the Insect Order Thysanoptera"; J. D. Hood.

"Biological Explorations in Eastern Panama"; E. A. Goldman.

"Notes on Variation, Distribution, and Habits of the Pocket Gophers of the Genus *Thomomys*"; Vernon Bailey.

May 1, 1915—541st Meeting.‡

Vice-President Rose in the chair and 26 persons present.

Dr. O. P. Hay made remarks on a North American specimen of the extinct mammalian genus *Nothrotherium*.

*Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 371–373, May 19, 1915; and in Science, N. S., Vol. 41, pp. 735–736, May 4, 1915.

†Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 409–410, June 4, 1915; and in Science, N. S., Vol. 41, p. 877, June 11, 1915.

‡Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 411–412, June 4, 1915; and in Science, N. S., Vol. 41, p. 878, June 11, 1915.

Mr. William Palmer remarked that he had lately seen a European skylark in Virginia, and exhibited the jaws of a ray from Chesapeake Beach, Maryland.

Mr. E. W. Nelson called attention to the newspaper notoriety attained by the San Antonio, Texas, bat roosts.

Two communications were presented:

"Observations on New Dinosaurian Reptiles"; C. W. Gilmore.

"The Basic Facts of Bird Coloration"; William Palmer.

May 15, 1915—542d Meeting.*

President Bartsch in the chair and 43 persons present.

Dr. L. O. Howard exhibited lantern slide views of the moth *Ceratomia amyntor*.

Four communications were presented:

"Two Years' Investigation in Peru of Verruga and its Insect Transmission"; C. H. T. Townsend.

"The Uses of Weevils and Weevil Products in Food and Medicine"; W. Dwight Pierce.

"Observations on Mosquitos and House Flies"; L. O. Howard.

"Remarks on Some Little-known Insect Depredators"; A. L. Quaintance.

October 23, 1915—543d Meeting.†

President Bartsch in the chair and 85 persons present.

Dr. C. W. Styles made remarks on blood examinations of children and on generic names of birds.

Dr. J. N. Rose exhibited Brazilian hummingbird nests.

Two communications were presented:

"Collecting Grasses in the Southwest"; A. S. Hitchcock.

"African Studies: Things in Common Among Men, Apes, and other Mammals"; R. L. Garner.

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*Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 448–450, June 19, 1915; and in Science, N. S., Vol. 41, pp. 915–916, June 18, 1915.

†Abstracts in Journ. Washington Acad. Sci., Vol. 5, pp. 652–653, December 4, 1915; and in Science, N. S., Vol. 42, pp. 843–844, December 10, 1915.

November 6, 1915—544th Meeting.*

President Bartsch in the chair and 90 persons present.

Three communications were presented:

"A New Pleistocene Sloth from Texas"; O. P. Hay.

"Botanical Explorations in South America"; J. N. Rose.

"Some Biological Pictures of Oahu (Hawaii)"; L. O. Howard.

November 20, 1915—545th Meeting.†

President Bartsch in the chair and 50 persons present.

Mr. Lewis Radcliffe made remarks on the rearing of shad in ponds and exhibited specimens.

Three communications were presented:

"The Dispersal of Some Species of Flies"; Frederick Knab.

"Notes on the Habits of the Duck Hawk"; Alex Wetmore.

"Geographical Relationships of the Philippine Flora"; Elmer D. Merrill.

December 4, 1915—546th Meeting. ‡

President Bartsch in the chair and 55 persons present.

Resolutions with respect to the death of George M. Sternberg, former President of the Biological Society, were read and adopted.

Dr. O. P. Hay made remarks on a fossil walrus and exhibited a specimen.

Dr. L. O. Howard made remarks on the cluster fly.

Two communications were presented:

"Identification of the Stages in the Asexual Cycle of *Bertonella bacilliformis*, the Pathogenic Organism of Verruga, and their Bearing on the Etiology and Unity of the Disease"; Charles H. T. Townsend. §

"Mississippi River Dam at Keokuk, its effect on Biological Conditions, especially those of the Plankton"; A. A. Doolittle.

* Abstracts in Journ. Washington Acad. Sci., Vol. 6, p. 24, January 4, 1916; and in Science, N. S., Vol. 42, p. 880, December 17, 1915.

† Abstracts in Science, N. S., Vol. 43, pp. 75-76, January 14, 1916.

‡ Abstracts will shortly appear in the Journal of the Washington Academy of Sciences, and in Science.

§ Journ. Washington Acad. Sci., Vol. 5, pp. 662-667, December 19, 1915.

December 18, 1915—547th Meeting.

THIRTY-SIXTH ANNUAL MEETING.

President Bartsch in the chair and 27 persons present.

The annual reports of officers and committees were received.

The following officers were elected for the year 1916:

President: W. P. Hay.

Vice-Presidents: J. N. Rose, A. D. Hopkins, Hugh M. Smith, Vernon Bailey.

Recording Secretary: M. W. Lyon, Jr.

Corresponding Secretary: W. L. McAtee.

Treasurer: Wells W. Cooke.

Members of Council: N. Hollister, J. W. Gidley, William Palmer, Alex Wetmore, Edgar A. Mearns.

President Hay was selected to represent the Society as a Vice-President of the Washington Academy of Sciences.

President Hay appointed as Committee on Publications for 1916: N. Hollister, W. L. McAtee, Wells W. Cooke; as Committee on Communications for 1916: William Palmer, Alex Wetmore, Lewis Radcliffe, J. W. Gidley, W. R. Maxon, and H. S. Barber.

Vol. XXVIII, pp. 1–14 February 12, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FIRST LIST OF THE FISHES OF THE VICINITY OF PLUMMERS ISLAND, MARYLAND.

BY W. L. McATEE AND A. C. WEED.

Introduction.

Plummers Island lies in the Potomac River, nine miles above the City of Washington, D. C. It has been the home of the Washington Biologists' Field Club since 1901. The study of its fauna and flora and to some degree that of the surrounding region, is one of the principal objects of the Club.

The present paper brings up to date the information on the fish fauna of this region. Collecting of fishes has been carried on with varying degrees of activity since 1905. The earlier work was done by W. L. McAtee assisted at times by Dr. A. K. Fisher, H. S. Barber, and W. H. Osgood. In 1912 A. C. Weed and W. L. McAtee collected vigorously, and much assistance was received at that time and since by J. D. Shafer, keeper of Lock No. 11, on the Chesapeake and Ohio Canal.

Region Treated.

For our survey of the fish fauna of the vicinity of Plummers Island we have selected as our faunal area that section of the Potomac River between Little Falls and Great Falls together with its tributary streams (see map, Plate I). Plummers Island is almost midway of this stretch of the river, which is clearly marked off as a faunal unit. The river between these two falls is deep and with considerable current as a rule; there are several important rapids and the bottom is rocky and rugged. Conditions thus are unfavorable for aquatic vegetation, a great factor in modifying the fish fauna. To any one acquainted with the

Potomac River, the contrast between Little River or Eastern Branch or even the main stream near Washington, with a wealth of water plants, or of the broad shallow stream so characteristic above Great Falls, with the section we are now treating, needs no emphasizing.

This portion of the river is further strongly characterized by the distribution of the anadromous fishes. Three species of herrings and two of sturgeons ascend to Little Falls but no further, while the shad, striped bass and white perch enter this section of the river only to be stopped by Great Falls.

Difficult Run, Va.

Our plans for collecting in Difficult Run were thwarted, and this is particularly unfortunate as Difficult is the largest creek system in our area. We are able to present only a brief list of species taken near the mouth. The upper course of this stream is the only water in our region known to be inhabited by the brook trout.

LIST OF FISHES.

Lower part	*Upper part*
Ameiurus catus	Salvelinus fontinalis
Semotilus atromaculatus	
Rhinichthys atronasus	
Lepomis auritus	
" gibbosus	
Micropterus dolomieu	

In ponds on the rocky headland just below Difficult Run sunfishes are very abundant. In the clear water a school of a hundred or more may be seen scrambling for a single morsel of food. The species noted are *Lepomis auritus*, *L. solis*, *L. gibbosus*, *L. cyanellus*, *and Chaenobryttus gulosus.*

Scotts Run, Va.

About ten miles west of the center of the City of Washington is an irregular ridge of from 400 to 500 feet elevation, whose surficial rocks belong to the Lafayette formation. This ridge has a total length of about 3½ miles and is the source of several of the largest creeks in the region. Here head an important branch of Difficult Run, Scotts Run, Pimmit Run, which joins the Potomac at Chain Bridge, Four-mile Run, emptying above

Alexandria, Holmes and Cameron Runs, which unite and flow into the river just below that city, and Accotink Creek, emptying five miles below. The distance between the mouths of the creeks at the extremes of this system, measured along the river, is 24 miles.

Scott's Run, the only one of this group in which we are especially interested in the present connection, has a total length of approximately 4½ miles. It drops into the river over a fall 25 feet above low water mark and within a half a mile from its mouth has a total descent of about 100 feet. The mouth is about 1½ miles above Plummers Island.

LIST OF FISHES.

Below the fall	*Above the fall*
Pimephales notatus	Catostomus commersonii
Notropis amoenus	Semotilus atromaculatus
" analostanus	Leuciscus vandoisulus
" hudsonius	Rhinichthys atronasus
Lepomis auritus	" cataractae
" gibbosus	Boleosoma olmstedi
Micropterus dolomieu	
Boleosoma olmstedi	

Dead Run, Va.

Dead Run has its source at Mackall Hill at an elevation of 300 feet, has a total length of about 2½ miles and empties into the river about ¼ mile below Plummers Island. The stream falls about 120 feet in the last half mile of its course.

LIST OF FISHES.

Below falls	*Above falls*
Various river fishes occasionally run in, as catfishes, sunfishes, and black bass.	Semotilus atromaculatus
	Rhinichthys atronasus

Turkey Run, Va.

This stream heads near Langley, Va., at an elevation of 240 feet. Its total length is about 1½ miles, and its descent in the last half mile of its course is about 100 feet.

LIST OF FISHES.

Below falls	*Above falls*
Hypentelium nigricans	Hybognathus nuchalis
Semotilus atromaculatus	Semotilus atromaculatus
Pimephales notatus	Leuciscus vandoisulus
Notropis amoenus	Rhinichthys atronasus
" analostanus	
" cornutus	
" hudsonius	
Ericymba buccata	
Campostoma anomalum	
Lepomis gibbosus	
Boleosoma olmstedi	

Discussion of Virginia Creeks.

Difficult Run is excluded because we know so little of its fauna. It is distinguished from all of the other creeks by possession of the brook trout.

Abrupt descent near the mouth is a striking characteristic of the other Virginia creeks and it is the chief factor in determining the nature of their fish fauna. Scotts Run, with an initial single obstacle 25 feet in elevation and a steep series of rapids immediately adding 75 feet more, nevertheless has the largest number of species occurring above the falls. The writers feel sure this is due to other factors than feasible water connections or climbing abilities of the fish. An old mill now stands about a mile from the mouth of the creek, and it is possible that small fishes collected elsewhere for bait may have been released above the dam or in the race supplying the mill. Other agencies of transportation and other motives are conceivable.

The more normal conditions are represented by Dead and Turkey Runs. Dead Run falls 120 feet in its last half mile in a series of rapids which includes one particularly long steep waterslide with never more than a thin sheet of water running over it. Only those redoubtable climbers, the fall fish (*Semotilus atromaculatus*) and the black-nosed dace (*Rhinichthys atronasus*) have surmounted these obstacles. Repeated investigations of the upper reaches of the brook have revealed no other species.

Turkey Run, although falling 100 feet in its last half mile has no single fall of any magnitude. Its plunge into the river is by means of a large number of small rapids. This probably explains why two more species (*Hybognathus nuchalis* and

Leuciscus vandoisulus) were able to reach the upper part of the stream than was the case in Dead Run. There is little probability that there has been any meddling by mankind with the fish fauna of these two streams.

Rock Run, Md.

Rock Run has its source near Potomac, and after a course of about 5 miles, no part of which is precipitous, empties into the Potomac just below Lock 11 of the Chesapeake and Ohio Canal. This run flows under the canal through a large culvert. Here the stream is shallow and of comparatively uniform depth; it flows from the culvert in a thin sheet and drops about 18 inches into a deep pool. In time of flood river water backs into this culvert; nevertheless large fishes running in from the river do not as a rule go above this pool. Scores of *Catostomus* and *Moxostoma* are netted here every spring. The culvert marks very well the boundary between the true creek fauna and the intruders from the river.

The following have been taken only *in or above* the culvert:

Semotilus atromaculatus
Leuciscus vandoisulus
Notropis cornutus
Rhinichthys cataractae
Boleosoma olmstedi
Etheostoma flabellare

The following species have been taken only *below* the culvert:

Moxostoma macrolepidotum
Anguilla rostrata
Ambloplites rupestris
Chaenobryttus gulosus
Lepomis cyanellus
" gibbosus

The following species have been taken *both above and below* the culvert:

Schilbeodes insignis
Catostomus commersonii
Hypentelium nigricans
Pimephales notatus
Notropis amoenus
" hudsonius
Rhinichthys atronasus
Exoglossum maxillingua
Lepomis auritus (only one small specimen taken in culvert. Probably accidental; this fish clearly belonging to the deeper water fauna)

Cabin John Run, Md.

Cabin John Run rises near Rockville, and has a total course of about 7½ miles. It also flows through a culvert under the canal, and it is at this point that most of the following species were collected:

Schilbeodes insignis
Catostomus commersonii
Hypentelium nigricans
Semotilus corporalis
" atromaculatus
Leuciscus vandoisulus
Notemigonus crysoleucas
Pimephales notatus
Notropis procne
" hudsonius
" arge
Notropis amoenus
" analostanus
" cornutus
Ericymba buccata
Rhinichthys atronasus
" cataractae
Hybopsis kentuckiensis
Exoglossum maxillingua
Percopsis omiscomaycus
Boleosoma olmstedi
Etheostoma flabellare

Canal.

The Chesapeake and Ohio Canal, if left undisturbed, would soon become a fish paradise. It supports an abundant growth of submerged vegetation, something the river in this region almost entirely lacks. However it is drained every winter and fish can not become permanently established. Although this is bad for the fishes, it is very good for collectors, and our records are practically complete up to date. However, owing to the way in which the canal is filled (diversion of river), its length, and the number of tributaries, something new may turn up at any time. Our notes refer to the level between locks 11 and 12, a stretch bordering the property of the Washington Biologists' Field Club.

list of species.

Ictalurus punctatus
Ameiurus catus
" nebulosus
Schilbeodes insignis
Carpiodes cyprinus
Catostomus commersonii
Hypentelium nigricans
Erimyzon sucetta oblongus
Cyprinus carpio
Notemigonus crysoleucas
Notropis hudsonius
" amoenus
Rhinichthys cataractae
Anguilla rostrata
Dorosoma cepedianum
Esox reticulatus
Pomoxis sparoides
" annularis
Ambloplites rupestris
Chaenobryttus gulosus
Lepomis cyanellus
" auritus
" gibbosus
Micropterus dolomieu
Perca flavescens
Boleosoma olmstedi
Morone americana

Channel between Plummers Island and Maryland Shore.

In low water this channel is narrow enough to be crossed in a single step at three different places. At such a stage the water

flows two ways from a point at the western end of the island where is the mouth of a small creek; the maximum depth is about 8 feet. During floods a broad strong current sweeps through this channel, the water often rising as much as 15 feet above the ordinary level.

This channel is used as a breeding place by black bass, sunfishes and catfishes.

LIST OF SPECIES.

Ictalurus punctatus
Ameiurus catus
" nebulosus
" natalis
Schilbeodes insignis
Catostomus commersonii
Semotilus atromaculatus
Notemigonus crysoleucas
Pimephales notatus
Notropis amoenus
" analostanus
" cornutus
" hudsonius
Ericymba buccata
Rhinichthys atronasus
Hybopsis kentuckiensis
Anguilla rostrata
Dorosoma cepedianum
Pomoxis sparoides
" annularis
Chaenobryttus gulosus
Lepomis cyanellus
" auritus
" gibbosus
Micropterus dolomieu
" salmoides
Boleosoma olmstedi

The Main River.

The Potomac between Great Falls and Little Falls is characterized by its rocky shores and bed, its numerous rapids, alternating with deep stretches and its exceedingly irregular bottom. There is almost no aquatic vegetation. Off Plummers Island soundings of 80 feet have been obtained; at ordinary stages the river here is about 100 yards wide. A mile above the island is a rather important rapid known as Stubblefield Falls; a small rapid begins a quarter of a mile below.

The names of many fishes inhabiting the main river need not be repeated here, as a complete list would include all species previously recorded for the lower reaches of brooks as well as those found in the channel behind Plummers Island All of these must at times travel about in the river, and collections in the main river, no matter where, would yield some of them. The following species include those which so far as known are confined to the main river, together with several (starred) whose place of occurrence it is desirable to definitely record.

LIST OF SPECIES.

*Petromyzon marinus
Ictalurus furcatus
*Carpiodes cyprinus
*Erimyzon sucetta oblongus
Alosa sapidissima
*Perca flavescens
*Stizostedion vitreum
Roccus lineatus
*Morone americana

Restriction of Fishes to Certain Parts of Our Area.

The brook trout is confined to Difficult Run, probably because that stream was the first resort found in the down-stream journey by some pioneers or waifs from the normal mountain home of the species. *Campostoma anomalum* and *Hybognathus nuchalis* have so far been collected only in Turkey Run; both should be found elsewhere. *Boleosoma effulgens* has been found at Little Falls; if it occurs in the upper part of these rapids it may fairly be considered as a species of our area. *Percopsis omiscomaycus* has been collected only in Cabin John Run; and *Exoglossum maxillingua* and *Etheostoma flabellare* shared by this stream and Rock Run have not been found elsewhere. The pickerel (*Esox reticulatus*) has been taken only in the canal. The river alone harbors the shad, and the striped bass, and has yielded the only specimens so far caught of the sea lamprey, forked-tailed catfish, and pike-perch. The carp sucker (*Carpiodes cyprinus*), chub sucker (*Erimyzon sucetta oblongus*), the yellow perch, and white perch, have been taken in both the canal and river but nowhere else, and the mud-shad (*Dorosoma*) has been collected only in the channel behind Plummers Island and in the canal.

Ecology of Some of the Fishes.

Some of the above-mentioned restrictions in distribution are no doubt due to ecological conditions; others can not be so explained. A fact impressed upon one when seining the various brooks is the extent to which the upper courses of the creeks are monopolized by the fall fish (*Semotilus atromaculatus*) and the black-nosed dace (*Rhinichthys atronasus*). These fishes are of general distribution but it is evident that they are expert climbers. They do not ascend streams merely to spawn for the upper reaches of the brooks always have a certain population of these two species. *Etheostoma flabellare* was found only in shallow

riffles; *Exoglossum*, *Leuciscus* and *Rhinichthys cataractae* were usually in swirling pools just beneath miniature cataracts.

ANNOTATED LIST OF SPECIES.

Petromyzonidæ.

Petromyzon marinus Linnaeus.—A lamprey about 18 inches long was found dead on rocks at the lower end of Plummers Island, May 14, 1905. The species must frequently occur in our waters as it commonly clings to shad on their run up the river.

Siluridæ.

Ictalurus furcatus (Le Sueur).—An introduced species. Our only definite record is for two specimens taken in the river April 28, 1912.

Ictalurus punctatus (Rafinesque).—Spotted cat. Introduced, abundant in the main river. The largest specimen taken weighed 8 pounds and individuals of from 2 to 4 pounds are common. One weighing 4¼ pounds was caught on a hook baited with an 8 inch fish of the same species. The young are most distinctly spotted. The members of the species found in the channel between Plummers Island and the Maryland shore and in the canal are usually under 2 pounds in weight. Examination of a few stomach contents resulted as follows:

May 17, 1907. The stomach and intestines were filled with seeds of the white elm (*Ulmus americanus*), about 400 of which were present. These constituted 98 per cent of the food. The remaining 2 per cent consisted of: 1 snail, 1 ant, 1 *Dryops lithophilus*, 1 mandible of hellgramite (*Corydalis cornutus* larva), and a few other fragments of insects.

May 18, 1907. One stomach contained the head and skin of an eel which had just been thrown in the river, and the intestines were full of macerated elm seeds. The stomach of another specimen also was filled with the last mentioned material.

July 4, 1908. Ninety per cent of the contents of a stomach was made up of adult mayflies (*Hexagenia bilineata*). A few stone-fly larvae, a beetle (*Stenelmis*), and vegetable debris including bits of juniper twigs and a seed of *Smilax rotundifolia* made up the remainder.

Ameiurus catus (Linnaeus).—Mississippi or Channel cat. Common in the river.

Amieurus nebulosus (Le Sueur).—Mud cat. Abundant, particularly in the channel behind Plummers Island and in the canal. A pair had their nest in the channel near the ferry in the summer of 1912. Both adults constantly guarded the nest, as they did also the carefully herded young for a fortnight or more. When the canal is drained young catfish of this species are to be seen in large numbers. In December, 1913, about a solid half bushel of mud cats, 6 to 8 inches long, were seen in a single small pothole. Apparently each was striving to get to the bottom of the mass, so that all were in constant motion. This performance lasted for days and weeks, and so far as could be observed, without cessation.

Ameiurus natalis (Le Sueur).—Yellow cat. Occasionally taken in the channel behind Plummers Island.

Ameiurus nebulosus and *A. natalis* from this region are not nearly so well differentiated as they are, for example, in Lake Ontario. The information at hand does not show whether or not this is a case of hybridization under the somewhat unnatural conditions of the Plummers Island Channel.

Schilbeodes insignis (Richardson).—Red-eyed cat. Occurs in Rock Run, Cabin John Run, the river and canal. A specimen of near the maximum size for the species was taken on hook and line in Sycamore Cove, September 4, 1911.

CATOSTOMIDÆ.

Carpiodes cyprinus (Le Sueur).—American carp. Occasional in the river and rare in the canal.

Catostomus commersonii (Lacépède).—Yellow sucker. White sucker. Hickory shad. Common everywhere in the river and larger creeks; occasional in the canal. Large numbers ascend Rock Run in March and April.

Hypentelium nigricans (Le Sueur).—Black sucker. Spotted sucker. Stone roller. Taken in the river, and in Rock, Cabin John and Turkey Runs. Large individuals are caught in Rock Run in spring, and specimens are sometimes found in the canal.

The name *Hypentelium* which has been used subgenerically seems to us to be worthy of generic rank. *Catostomus* is distinguished among the suckers by having the air bladder *large* and divided into two parts. In *Hypentelium* the air bladder is rudimentary. The cranium of *Hypentelium* is much shorter and broader than in any species of *Catostomus* and the pectoral fins are set lower and carried horizontally instead of vertically as in most fishes (see Plate II). *Hypentelium* is developed as a bottom fish and seems to us to be much farther removed from *Catostomus* than is *Pantosteus*.

Erimyzon sucetta oblongus (Mitchill).—Mountain sucker. Chub sucker. Rare in river and canal.

Moxostoma macrolepidotum (Le Sueur).—Large specimens are caught in Rock Run in April.

CYPRINIDÆ.

Cyprinus carpio (Linnaeus).—Carp. Abundant in the river and fairly numerous in canal. The largest specimen from the vicinity of Plummers Island examined was 27 inches long and weighed 7¾ pounds.

Campostoma anomalum (Rafinesque).—Two taken in Turkey Run, Va., March 27, 1912. Not hitherto recorded from this region.

Hybognathus nuchalis Agassiz. Taken only in Turkey Run.

Semotilus corporalis (Mitchill).—Our only records are for Cabin John Run.

Semotilus atromaculatus (Mitchill).—Horned chub. Abundant in all the creeks, particularly in their upper courses. Found also in shallow

parts of the river. A specimen taken in Dead Run, May 9, 1907, had only damselfly nymphs in the stomach and intestines.

Leuciscus vandoisulus Cuvier and Valenciennes.—Common in all the large creeks, except Dead Run where it has not yet been taken.

Notemigonus crysoleucas (Mitchill).—Roach, Mill Roach. Common in the canal and river, also taken in Cabin John Run.

Pimephales notatus (Rafinesque).—Abundant in shallow parts of river and about the mouths and in the lower reaches of creeks.

Notropis procne (Cope).—Taken only in Cabin John Run.

Notropis hudsonius amarus (Girard).—Shiner, Smelt. Common in most of the creeks, in shoal portions of the river and in the canal.

Notropis arge (Cope). Specimens provisionally identified as this species have been collected in Cabin John Run.

Notropis amoenus (Abbott).—Common in most of the creeks and in Plummers Island channel. Taken in the canal February, 1914.

Notropis photogenis (Cope).—Plummers Island channel October 15, 1905. Rock Run, March 10, 1912.

The differential characters of the three preceding species are so obscure and recent investigations have thrown so much doubt on the subject that we are unable to decide whether the specimens should be referred to one species or to three or more.

Notropis analostanus (Girard).—Has been taken in Cabin John, Scotts and Turkey Runs and in Plummers Island channel.

Notropis cornutus (Mitchill).—This species has been collected in Plummers Island channel, and in Rock, Cabin John and Turkey Runs. Specimens taken in Rock Run March 17, 1912, exhibited the breeding colors.

Ericymba buccata (Cope).—Collected in Plummers Island Channel July 14, 1906, about 5 years before it was recorded as an inhabitant of this region. Also taken in Cabin John and Turkey Runs.

Rhinichthys cataractae (Cuvier and Valenciennes).—Collected in Rock, Cabin John and Scotts Runs. Not rare. Taken in the canal February, 1914.

Rhinichthys atronasus (Mitchill).—An ubiquitous species, most common in creeks, especially their upper courses.

Hybopsis kentuckiensis (Rafinesque).—This species has been taken in Plummers Island channel, in the canal and in Cabin John Run.

Exoglossum maxillingua (Le Sueur).—Tongue chub, Black chub, Nigger perch. Common in Rock and Cabin John Runs.

ANGUILLIDÆ.

Anguilla rostrata (Le Sueur).—Eel. Abundant in river and canal, goes little beyond the mouths of creeks. The largest specimen seen was 3 feet long.

DOROSOMATIDÆ.

Dorosoma cepedianum (Le Sueur).—Mud shad. Single specimens have been taken in Plummers Island channel (October 15, 1905), and

in the canal (December 14, 1913). The largest individual was 10½ inches long over all.

CLUPEIDÆ.

Alosa sapidissima (Wilson).—Shad. Ascends the Potomac to Great Falls, hence is transient in our waters. Shad are still caught in dip nets both at Great and Little Falls; formerly some fishing of this nature was done at Stubblefield Falls.

SALMONIDÆ.

Salvelinus fontinalis (Mitchill).—Brook trout. In 1899 Smith and Bean published the following remarks about the brook trout: "In former years this fish inhabited Difficult Run, on the Virginia side of the Potomac, below Great Falls, but was supposed to have been long since exterminated. Recently, however, a few have been taken in this stream." (P. 184).

ESOCIDÆ.

Esox reticulatus (Le Sueur). Pike. Trout. Of occasional occurrence in the canal.

PERCOPSIDÆ.

Percopsis omiscomaycus (Walbaum).—Smith and Bean (p. 185) state that this species has been taken in Cabin John Run.

CENTRARCHIDÆ.

Pomoxis sparoides (Lacépède).

Pomoxis annularis Rafinesque.—These two introduced species are indiscriminately referred to as Crappie. They are about equally common and occur both in the river and canal. A specimen of *annularis* caught May 19, 1907, measured 13¼ inches over all.

Ambloplites rupestris (Rafinesque).—Goggle-eye. Introduced, has been collected in Rock Run and in the canal.

Chaenobryttus gulosus (Cuvier and Valenciennes). Introduced, has been taken in Plummers Island channel, in Rock Run and the canal. A specimen caught in Rock Run, April 7, 1912, has in many ways the appearance of a hybrid. It has the shape of head, dentition, scaling and fin count of *Chaenobryttus* and the color and body form of *Lepomis cyanellus*. An apparent hybrid with *Lepomis gibbosus* was taken in a pool near Difficult Run, June 11, 1911.

Lepomis cyanellus (Rafinesque).—Introduced and fairly common. Has been taken in Plummers Island channel, in Rock Run and the canal. Occurs also in some of the pools near Difficult Run.

Lepomis auritus (Linnaeus).—Bream, Brim. Abundant in the river, canal and the mouths of creeks. Several nests of this species were observed in Plummers Island channel during the latter half of June, 1908. They were guarded by the males but were finally abandoned as the water lowered before hatching occurred. The stomachs of specimens

caught in Sycamore cove, September 18, 1910, contained caterpillars of *Heterocampa manteo* and *Ceratomia amyntor*, and an adult locustid, *Scudderia furcata*.

Lepomis solis (Cuvier and Valenciennes).—Bean and Weed (p. 173) comment on the status of *solis* and state that it probably should stand as a separate species. If recognized as anything more than a variety, it will have to so stand as it occurs with *auritus* under conditions where the two forms could not breed true, except for the intervention of a physiological difference sufficient to prevent cross-breeding. A case in point is the colonies of sunfishes in pools on a rocky headland just below Difficult Run. The abundance of *Lepomis* in these water pockets is such that we may say they are saturated with sunfishes. *Gibbosus*, *cyanellus auritus* and *solis* occur here and one is as recognizable and distinct as the other. *Chaenobryttus gulosus*, however, seems to hybridize with all.

Lepomis gibbosus (Linnaeus).—Punkin seed. Abundant in the river, canal, and in the pools above mentioned, and occasional in the mouths of creeks.

Micropterus dolomieu (Lacépède).—Black bass. Introduced, common in the river, sparingly distributed in the canal.

Micropterus salmoides (Lacépède).—Introduced. The only definite record for our region is a capture on hook and line in the Plummers Island channel, September 13, 1911.

Percidæ.

Perca flavescens (Mitchill).—Yellow perch. Ring perch. Occurs in both the canal and river, sometimes rather commonly in the latter.

Stizostedion vitreum (Mitchill).—One specimen was caught in the river April, 1913.

Boleosoma olmstedi (Storer).—Abundant and almost omnipresent. Darters as a rule are lovers of rocky riffles and swift currents, but this species is often found on mud bottom in deep pools and in canal locks. Specimens taken in Rock Run March 17, 1912, appeared to be nearly ready for spawning.

Boleosoma effulgens (Girard).—Recorded by Smith and Bean from Little Falls and as it occurs in the rapids themselves it fairly belongs in our list.

Etheostoma flabellare (Rafinesque).—Not uncommon in Rock and Cabin John Runs.

Serranidæ.

Roccus lineatus (Bloch).—Striped bass. This species ascends the river to Great Falls. A few small specimens have been caught on hook and line in the vicinity of Plummers Island.

Morone americana (Gmelin).—White perch. The white perch runs up the Potomac as far as Great Falls. The main run occurs in spring but individuals linger in our waters and they may be captured at almost any season. We have collected this species both in the river and the canal.

The last two species and the shad exemplify gradations of a fundamentally simple habit. All are anadromous, and ascend the river primarily to spawn. The shad do not linger after performing this function and the young apparently soon leave the upper river. Adults of the striped bass behave about the same while young of various sizes linger in these waters. The adults of white perch, however, are apparently at home in our waters, and some of them are present throughout the year.

Summary.

Of the 54 species in the above list 10 are known to have been introduced into the Potomac and possibly some of the others were. The known introductions include two species of catfish, the carp, two crappies, the goggle-eye, the warmouth, one sunfish, and two kinds of bass.

Approximately 83 per cent of the species belong to five families of fishes, while the remainder, 9 species in all, represent 8 families. The Cyprinidæ or minnow family ranks first with 19 species; the other important families are sunfishes and bass (*Centrarchidæ*), 10 species; catfishes (*Siluridæ*), 6 species; and suckers (*Catostomidæ*), and perches (*Percidæ*) with 5 each.

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List of fishes known to inhabit the waters of the District of Columbia and vicinity. Bull. U. S. Fish Commission. (1898), 1899, pp. 179–187. Records 8 species from our region.

Bean, Barton A., and Weed, Alfred C.

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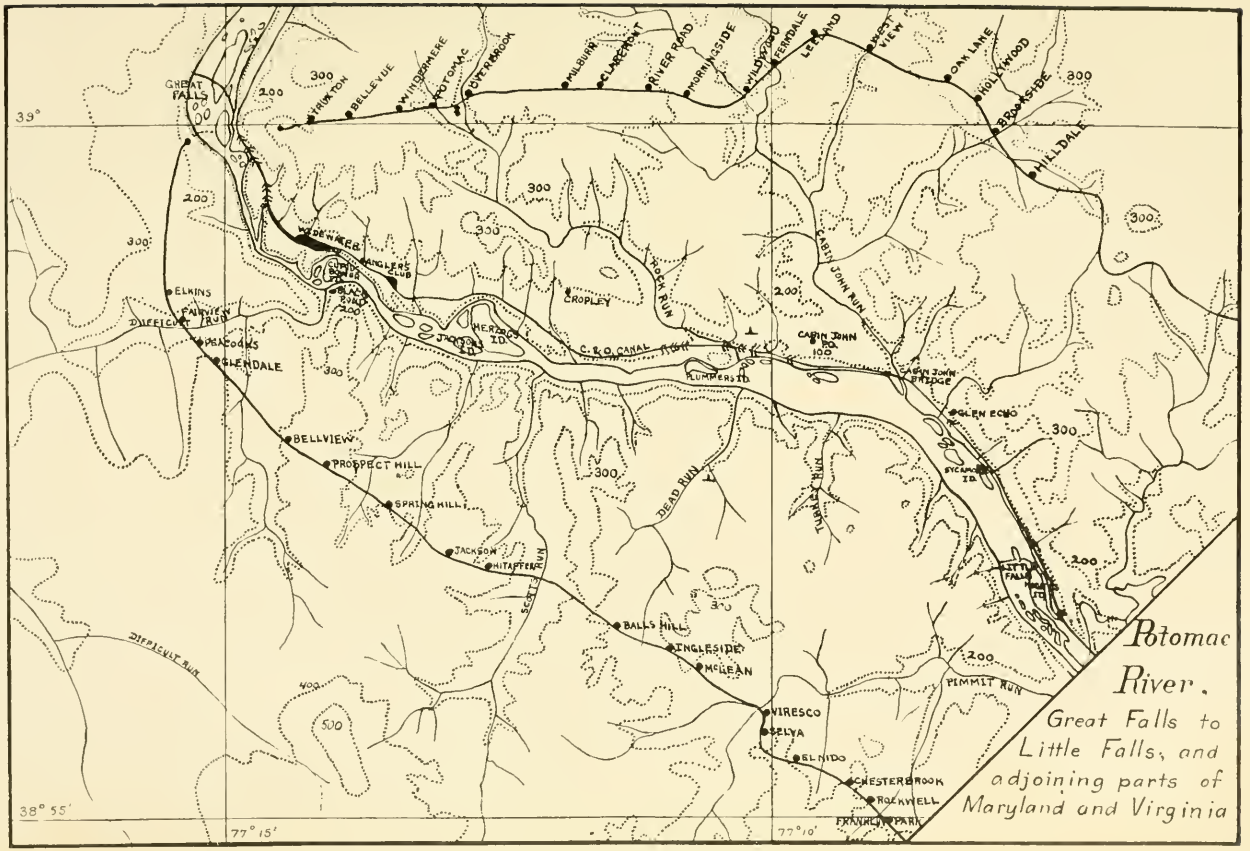
GREAT FALLS
39°
38° 55'
77° 15'
77° 10'
TRUXTON
BELLEVUE
WINDEMERE
POTOMAC
GLEN ECHO HEIGHTS
WILBURN
CLAREMONT
RIVER ROAD
MORNINGSIDE
WESTOVER
FERNDALE
LEE MAR
SWEET VIEW
OAK LANE
HOLLYWOOD
SEDGESIDE
HILLDALE
WORKHOUSE
ANGLERS CLUB
ELKINS
FAIRVIEW
DIFFICULT RUN
PEACOCKS
GLENDALE
CROPLEY
ROCK RUN
CABIN JOHN RUN
CABIN JOHN
CABIN JOHN BRIDGE
C. & O. CANAL
HERRING I.
JONES I.
LUMPERS I.
GLEN ECHO
BELLVIEW
PROSPECT HILL
SPRING HILL
DEAD RUN
TURKEY RUN
JACKSON
CHITAFFER RUN
SCOTT RUN
BALLS HILL
INGLESIDE
McLEAN
DIFFICULT RUN
VIRESCO
SELVA
EL NIDO
CHESTERBROOK
ROCKWELL
FRANKLIN PARK
PIMMIT RUN
Potomac River.
Great Falls to Little Falls, and adjoining parts of Maryland and Virginia

Hypentelium nigricans, showing position of fins.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE WATER SHREW OF NOVA SCOTIA.

BY GLOVER M. ALLEN.

In the Bangs Collection, now the property of the Museum of Comparative Zoology, is a series of Water Shrews (*Neosorex*) obtained some years ago by Mr. Outram Bangs in Nova Scotia. These specimens I have lately had occasion to compare with skins representing true *N. albibarbis*, collected in August, 1914, near Tupper Lake in the Adirondacks of New York, by Messrs. Thomas and Fritz Barbour, Dr. J. L. Huntington, and myself. Much to my surprise the Nova Scotian specimens prove not to be *albibarbis* but are at once distinguishable by the whitish underparts, bicolor tail, and more plumbeous instead of blackish coloration above. In these respects they resemble *N. palustris* of western North America, described by Richardson (Zool. Journ., 1828, vol. 3, p. 517) as found in "marshy places from Hudson Bay to the Rocky Mountains." Although undoubtedly the Nova Scotian race intergrades with *palustris*, it is much smaller of skull and differs slightly in color. It may be known as

Neosorex palustris acadicus subsp. nov.

Type, skin and skull 2046, Bangs Collection, Museum of Comparative Zoology, from Digby, Nova Scotia; female, collected July 26, 1894, by Outram Bangs.

General Characters.—Body measurements as in *palustris*, but the coloration above with a slightly brownish cast instead of clear dark plumbeous, belly whitish or silvery, slightly clouded with brownish on the chest; tail bicolor; skull and teeth smaller than in *palustris*.

Description.—Entire dorsal surface of the body a very dark blackish brown, slightly paler on the sides, which with the head and shoulders are very slightly frosted through the presence of minute silvery tips to

the hairs. Ventral surface of body and fore limbs soiled whitish, slightly washed with pale brown across the chest. The bases of the hairs, except at the chin, are dull plumbeous. Wrists and central part of the metacarpal area are dark like the back, the fingers and edges of the palm white. The hind legs are dusky all around and this color extends to the entire outer part of the hind foot above, but the three inner toes and the metatarsal area corresponding are white. Tail sharply bicolor; dark like the back on its upper side and practically all around at the tip. Below it is pure white, but this area narrows terminally and ends at about a centimeter from the tip.

Skull.—The skull does not differ appreciably from that of *albibarbis* though the braincase seems to be a trifle wider. From *palustris*, as represented by Alberta specimens assumed to be typical, it differs in the much shorter rostrum, though the braincase is equally broad. The appearance of breadth is therefore much more marked in the Nova Scotian animal, though it is only proportionately broader. The teeth are smaller, but seem essentially the same in structure, though the third unicuspid in the specimens at hand appears to be relatively smaller in comparison with the fourth.

Measurements.—The collector's measurements of the type specimen are: total length 150.5 mm., tail 66.5, hind foot 20, which are essentially the same as for *palustris* (Merriam gives 155, 65.5, and 19 respectively for the corresponding measurements taken from Richardson's description, and 157, 68, and 20 for a specimen from Edmonton, Alberta). A large male from Halifax, N. S., measures 167, 69, 19.5 for these respective dimensions.

The following cranial measurements are taken from the type skull, with in parentheses the corresponding dimensions of a specimen of *palustris* from Alberta: greatest length 20.8 (22.1), basal length 18 (19.5), palatal length 9.1 (10.3), upper tooth row 9 (10), greatest width outside molars 5.8 (6.1), greatest width of brain case 10.1 (10). For a specimen of *palustris* from Edmonton, Alberta, Merriam gives, greatest length 22.5, width of braincase 10.2.

Remarks.—The Nova Scotia Water Shrew is closely related to *N. palustris palustris*, from which it differs in the size and proportions of the skull, and in its slightly browner color, which on the belly is sometimes a very pronounced wash. Intergradation takes place, probably in the region of southern Canada. Preble (No. Amer. Fauna, 1902, No. 22, p. 71) considers specimens from the north of Lake Winnipeg as representing *palustris*, with which their skulls agree; he mentions, however, that in some specimens the belly is slightly washed with brownish. Probably the smaller Rocky Mountain Water Shrew (*navigator*) should likewise be considered a subspecies of *palustris* and it was so regarded by Merriam (No. Amer. Fauna, 1895, No. 10, p. 93) who says that it "fluctuates considerably in size in the various mountain ranges it inhabits, and seems to intergrade completely with *S. palustris*. Specimens from the Bighorn and Wind River mountains in Wyoming are fairly intermediate, and it is probable that intergrades will be found along the east base of the Rocky Mountains in Alberta." The White-lipped Water Shrew (*N. albibarbis*) the type

of which is from Profile Lake, Franconia Mountains, New Hampshire, is very sharply distinguished from *palustris* and *acadicus* by its much blacker dorsal surface which is hardly at all contrasted with the dark, smoky brown belly, save at the chin, which is white. It is further distinguished by its tail, which is typically black both above and below. Nevertheless intergradation takes place in southern Canada, so that it must rank as a subspecies of *palustris*. Thus a specimen taken by A. E. and O. Bangs at Lake Edward, Quebec, is as silvery on the belly as in *acadicus*, but the chest and throat are dark brown; moreover the tail is entirely dark except at the base ventrally, where for about a centimeter it is pure white. A second specimen from North Bay, Ontario, is quite like *albibarbis* in having a dark belly and chest, and white chin, but the basal half of the tail is white ventrally. These specimens are therefore intermediate between *palustris*, *acadicus* and *albibarbis*. The continental forms of the typical subgenus, so far as now recognized, should stand as follows:

Neosorex palustris palustris (Richardson), from Hudson Bay west on the plains to the foothills of the Rocky Mountains.

Neosorex palustris navigator Baird, the Rocky Mountains from British Columbia to Colorado, and the Sierra Nevada of California, a slightly smaller race.

Neosorex palustris alaskanus (Merriam), known from southern Alaska (Point Gustavus, Glacier Bay); yet smaller with a shorter and more massive skull.

Neosorex palustris acadicus subsp. nov., from Nova Scotia westward, intergrading in southern Canada with typical *palustris* and the following.

Neosorex palustris albibarbis Cope, from the Adirondacks of New York and the White Mountains of New Hampshire southward along the Alleghanies; a darker race, with dark belly and tail, and white chin.

The problematical *Neosorex hydrodromus* (Dobson) described from Unalaska Island, Alaska, remains unknown except from the original diagnosis.

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PROCEEDINGS

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PROPOSAL OF NEW MUSCOID GENERA FOR OLD SPECIES.

BY CHARLES H. T. TOWNSEND, PH.D.

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This paper is intended to establish in as few words as possible certain new genera to contain already erected species which do not properly fall within any genus so far proposed. Definitions and relationship data are already in manuscript and will be published in a forthcoming treatment of muscoid genera of the world. As the differentiating characters are fixed in the holotypes of the species which stand as genotypes of these new genera, and as the full definitions must appear in the final work, their publication in advance of same is not deemed either essential or advisable.

For convenience of reference, arrangement is alphabetic by genotypes:

Spathimeigenia new genus.

Genotype, *Spathimeigenia spinigera* Townsend new name for *Admontia* (*Tachina*) *demylus* Coquillett, 1897, Rev. Tach. 54 (nec *Tachina demylus* Walker, 1849, List Dipt. Ins. IV. 779)—Holotype labeled by Coqt. as above, loc. Maryland (Schwarz), Bur. Ent. label "2624.01, June 24, 82."—Type No. 19133 U. S. N. M. ♀.

Euhyperecteina new genus.

Genotype, *Admontia nasoni* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 55.

Euadmontia new genus.

Genotype, *Admontia pergandei* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 54.

Ocypterosoma new genus.

Genotype, *Admontia polita* Coquillett, 1898, Can. Ent. XXX. 234.

Admontiopsis new genus.

Genotype, *Admontia tarsalis* Coquillett, 1898, Can. Ent., XXX. 234.

Paralispidea new genus.

Genotype, *Admontia unispinosa* Coquillett, 1898, Can. Ent. XXX. 234.

Euphorantha new genus.

Genotype, *Alophora diversa* Coquillett, 1897, Rev. Tach. 45 and 47.

Paraphasia new genus.

Genotype, *Alophora fenestrata*, Bigot, 1888, Ann. Soc. Ent. France, 1888. 255; Coquillett, 1902, Proc. U. S. N. M. XXV. 105 ft. note—Moscow, Idaho.

Paraphorantha new genus.

Genotype, *Alophora grandis* Coquillett, 1897, Rev. Tach. 45.

Alophoropsis new genus.

Genotype, *Alophora phasioides* Coquillett, 1897, Rev. Tach. 46.

Phasiomyia new genus.

Genotype, *Alophora splendida* Coquillett, 1902, Proc. U. S. N. M. XXV. 105 ft. note (In 1897, Rev. Tach. 46, referred to *Alophora fenestrata* Bigot, 1888)—(TD4329 female; 4330 male).

Amobiopsis new genus.

Genotype, *Amobia aurata* Coquillett, 1902, Proc. U. S. N. M. XXV. 119.

To this genus belongs also *Amobiopsis confundens* Townsend new name for *Amobia* (*Trixoclista*) *distincta* Coquillett, 1897, Rev. Tach. 139 (nec *Trixoclista distincta* Townsend, 1892, Trans. Am. Ent. Soc. XIX. 103)—Holotype labeled by Coquillett as above, loc. Holderness, N. H. (Koebele), Bur. Ent. label "2842.02, 24 | 3, 84"—Type No. 19134 U. S. N. M. ♂.

Phytopsis new genus.

Genotype, *Amobia californica* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 100.

Euaraba new genus.

Genotype, *Araba tergata* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 103.

To this genus belongs also *Tachina fastuosa* Meigen, 1824, Syst. Beschr. IV. 370. pl. 41. fig. 27.

Xenoppia new genus.

Genotype, *Xenoppia hypopygialis* Townsend new name for *Brachycoma* (*Sarcotachinella*) *intermedia* Coquillett, 1897, Rev. Tach. 132 (nec *Sarcotachinella intermedia* Townsend, 1892, Trans. Am. Ent. Soc. XIX. 111)—Holotype labeled by Coqt. as above, loc. S. Georgia (Morrison).—Type No. 19135 U. S. N. M. ♂.

Psammoppia new genus.

Genotype, *Brachycoma pulverea* Coquillett, 1897, Rev. Tach. 132.

Oppiopsis new genus.

Genotype, *Brachycoma sheldoni* Coquillett, 1898, Can. Ent. XXX. 236.

Trichocalliphora new genus.

Genotype, *Calliphora villosa* Desvoidy, 1830, Myod. 437.

Opsodexia new genus.

Genotype, *Chaetona bicolor* Coquillett, 1899, Jn. N. Y. Ent. Soc. VII. 221.

Phalacrodexia new genus.

Genotype, *Chaetona flavipennis* Coquillett, 1902, Proc. U. S. N. M. XXV. 121.

Phyllophila new genus.

Genotype, *Chaetona nitens* Coquillett, 1899, Jn. N. Y. Ent. Soc. VII. 221 (TD4368, 4369 female; 4363 male).

Chaetonopsis new genus.

Genotype, *Chaetona spinosa* Coquillett, 1899, Jn. N. Y. Ent. Soc. VII. 222.

Chlorotachina new genus.

Genotype, *Chrysosoma flaviceps* Macquart, 1851, Dipteres Exotiques, Suppl. IV. 158. pl. 16, ff. 9, 9a, 9b.

Goliathocera new genus.

Genotype, *Clausicella antennalis* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 56 (In 1897, Rev. Tach. 56, referred to *Lophosia setigera* Thomson, 1868, Dipt. Eugenies Resa, 527).

Carcinomyia new genus.

Genotype, *Cynomyia hirta* Hough, 1898, Ent. News IX. 166. figs.

Protodejeania new genus.

Genotype, *Dejeania hystricosa* Williston, 1886, Trans. Am. Ent. Soc. XIII. 297.

Metopotachina new genus.

Genotype, *Echinomyia palpalis* Coquillett, 1902, Proc. U. S. N. M. XXV. 120 ft. note (In 1897, Rev. Tach. 144, referred to *Fabricia infumata* Bigot, 1887).

Paragymnochaeta new genus.

Genotype, *Eugymnochaeta equatorialis* Townsend, 1912, Proc. U. S. N. M. XLIII. 314 (TD3973).

Chromatocera new genus.

Genotype, *Eulasiona setigena* Coquillett, 1897, Rev. Tach. 53.

Oxexorista Townsend, 1912, Proc. Ent. Soc. Wash. XIV. 165–66. (Correction.)

Genotype, *Oxexorista thompsoni* Townsend new name for *Exorista eudryae* Coquillett, 1897, Rev. Tach.100 (nec *Exorista eudryae* Townsend, 1892, Trans. Am. Ent. Soc. XIX. 287)—Holotype labeled by Coquillett as above, loc. Dayton, O. (H. S. Jewett).—Type No. 19136 U. S. N. M. ♀—(TD395, 425).

Note.—The confusion in original fixation of genotype was due to misidentification by W. R. Thompson, who merely compared my material with specimens so determined by Coquillett.

Homalactia new genus.

Genotype, *Exoristoides harringtoni* Coquillett, 1902, Proc. U. S. N. M. XXV. 110.

Cystogonia new genus.

Genotype, *Gonia turgida* Coquillett, 1897, Rev. Tach. 134.

Eufabriciopsis new genus.

Genotype, *Gymnomma quadrisetosa* Coquillett, 1902, Proc. U. S. N. M. XXV. 120.

Euhilarella new genus.

Genotype, *Gymnoprosopa fulvicornis* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 106; Rev. Tach. 198 (1897—*Hilarella*).

Eusenotainia new genus.

Genotype, *Hilarella rufiventris* Coquillett, 1897, Rev. Tach. 129.

Xanthocera new genus.

Genotype, *Xanthocera clistoides* Townsend new name for *Hyalurgus* (*Macquartia*) *johnsoni* Coquillett, 1897, Rev. Tach. 64 (nec. *Macquartia johnsoni* Townsend, 1892, Can. Ent. XXIV. 81)—Holotype labeled by Coqt. as above, loc. Algonquin, Ills.—Type No. 19137 U. S. N. M. ♀.

Xenadmontia new genus.

Genotype, *Hypostena degeerioides* Coquillett, 1895, Jn. N. Y. Ent. Soc. III. 58; 1897, Rev. Tach. 54 (*Admontia*).

Neohypostena new genus.

Genotype, *Hypostena gracilis* Coquillett, 1904, Proc. Ent. Soc. Wash. VI. 93.

Jurinodexia new genus.

Genotype, *Hystrisiphona bicolor* Giglio-Tos, 1893 and 1894, Ditteri del Messico, III. 54. f. 17; Boll. Mus. Zool. Anat. Univ. Torino VIII (1893).

Megapariopsis new genus.

Genotype, *Megaparia opaca* Coquillett, 1899, Jn. N. Y. Ent. Soc. VII. 218.

Melinocera new genus.

Genotype, *Meriania chalybaea* Coquillett, 1902, Proc. U. S. N. M. XXV. 119.

Trochilodexia new genus.

Genotype, *Mochlosoma anale* Giglio-Tos, 1893 and 1894, Ditteri del Messico, III. 55; Boll. Mus. Zool. Anat. Univ. Torino VIII (1893).

Calliphoropsis new genus.

Genotype, *Musca macularis* Walker, 1859, Proc. Linn. Soc. (London) Zool. III. 104.

Opsophasiops new genus.

Genotype, *Myiophasia flava* Coquillett, 1900, Proc. Linn. Soc. N. S. Wales, for 1900, 390 (TD1418, 1419).

Arctophyto new genus.

Genotype, *Paraphyto borealis* Coquillett, 1900, Proc. Wash. Acad. Sciences II. 439.

To this genus belongs also *Arctophyto wickhami* Townsend new name for *Paraphyto* (*Trixa*) *gillettei* Coquillett, 1897, Rev. Tach. 122 (nec *Trixa gillettei* Townsend, 1892, Can. Ent. XXIV. 68)—Holotype labeled by Coqt. as above, loc. Laggan, Alberta (Wickham)—Type No. 19138 U. S. N. M. ♀.

Phalacrophyto new genus.

Genotype, *Paraphyto sarcophagina* Coquillett, 1902, Proc. U. S. N. M. XXV. 118.

Eohyria new genus.

Genotype, *Pelatachina pellucida* Coquillett, 1897, Rev. Tach. 65.

Euphasiopteryx new genus.

Genotype, *Phasiopteryx australis* Townsend, 1911 and 1912, Proc. U. S. N. M. XLIII. 352 (TD4005).

To this genus belongs also *Phasiopteryx montana* Townsend, 1912, Jn. N. Y. Ent. Soc. XX. 114 (TD1791).

Phoranthella new genus.

Genotype, *Phoranthella morrisoni* Townsend new name for *Phorantha* (*Hyalomyia*) *occidentis* Coquillett p. p., 1897, Rev. Tach. 44 (nec *Hyalomyia occidentis* Walker, 1856, Diptera Saundersiana, 260)—Holotype labeled by Coqt. as above, loc. Georgia (Morrison).—Type No. 19139 U. S. N. M. ♀.

Cnephaliops new genus.

Genotype, *Pseudogonia ruficauda* Townsend, 1892, Can. Ent. XXIV. 66 (TD4415 and 4429, female; 4423, male hypopyg.).

Roeseliopsis new genus.

Genotype, *Racodineura americana* Coquillett, 1897, Rev. Tach. 66.

Myoceropsis new genus.

Genotype, *Rhynchiodexia flavotessellata* Walton, 1914, Proc. U. S. N. M. XLVIII. 176. pl. 6. f. 1.

Rutilodexia new genus.

Genotype, *Rutilia angustipennis* Walker, 1859, Proc. Linn. Soc. (London) Zool. III. 101.

Chrysorutilia new genus.

Genotype, *Rutilia formosa* Desvoidy, 1830, Essai Myodaires, 320.

Microrutilia new genus.

Genotype, *Rutilia minor* Macquart, 1846, Dipteres Exotiques, Suppl. I. 182.

Opsophyto new genus.

Genotype, *Sarcophaga opifera* Coquillett, 1892, U. S. Dept. Agr. Insect Life V. 22.

Chaetocrania new genus.

Genotype, *Spallanzania antennalis* Coquillett, 1897, Rev. Tach. 136.

Bombyliopsis new genus.

Genotype, *Tachina abrupta* Wiedemann, 1830, Aussereurop. Zweifl. Ins. II. 293 (TD372 and 1734—the last a western subspecies).

Ischyrophaga new genus.

Genotype, *Thelairodes ischyri* Coquillett, 1905, Can. Ent. XXXVII. 362.

Eutricogena new genus.

Genotype, *Tricogena setipennis* Coquillett, 1897, Rev. Tach. 130.

Euzelia new genus.

Genotype, *Zelia wildermuthii* Walton, 1914, Proc. U. S. N. M. XLVIII. 177, pl. 6, ff. 2 and 3.

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PROCEEDINGS

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ANDROPOGON HALEPENSIS AND ANDROPOGON SORGHUM.

BY CHARLES V. PIPER.

Johnson-grass, *Andropogon halepensis* (L.) Brot., and sorghum, *A. sorghum* (L.) Brot., are nearly always treated as distinct species in botanical works. Along with this botanical treatment, however, the statement is frequently made that the latter is believed to be derived from the former under cultivation. This conclusion is usually accredited to Hackel but without due consideration to what that botanist actually wrote. It is true Hackel considered that there was but one botanical species involved, namely, *Andropogon sorghum*, but consisting of two subspecies, *A. sorghum halepensis*, wild perennial or rarely annual plants with the spikelets readily deciduous at maturity, and *A. sorghum sativus* mostly cultivated, annual or in the tropics sometimes perennial plants, with the spikelets persistent at maturity. While Hackel regarded the cultivated plants as having been derived by cultivation from *A. sorghum halepensis*, he expressly writes that he does not believe that the wild varieties with rootstocks were at all concerned with the cultivated sorghums, but that the latter originated from such wild varieties as *effusus*, *virgatus* and *aethiopicus*, all of which are devoid of rootstocks.

A more satisfactory treatment of the plants in question is to consider them two distinct species—*Andropogon halepensis*, perennial plants possessing rootstocks, and *Andropogon sorghum*, annual plants (perennating in frostless regions) without rootstocks. The facts of distribution as well as those concerned

with the origin of the cultivated sorghums are consistent with this treatment.

In reaching the conclusions in the classification here presented the writer has had the advantage of studying many of the forms under cultivation, besides all the herbarium material in this country, and that at Kew and at Berlin. The location of each specimen studied is indicated by giving in parentheses the name of the herbarium to which it belongs.

KEY TO THE SUBSPECIES OF *Andropogon halepensis*.

Stems relatively slender, rarely over 7 mm. in diameter; leaf blade less than 30 mm. broad; rootstocks abundant.
  Panicle not loose and drooping.
    Awns present . . . . . *A. halepensis.*
    Awns wanting . . . . . *A. halepensis anatherus.*
  Panicle loose and drooping.
    Awns present . . . . . *A. halepensis miliformis.*
    Awns wanting . . . . . *A. halepensis muticus.*
Stems stout, 10–30 mm. in diameter; leaf blades 3–5 cm. broad; rootstocks few.
    Spikelets 4 mm. long . . . . . *A. halepensis propinquus.*
    Spikelets 4.5–5 mm. long . . . . . *A. halepensis siamensis.*

Andropogon halepensis (L.) Brot.

Holcus halepensis L. Sp. Pl. 1047. 1753. Based on the description and figure of Plukenet (Alm. 176. t. 32 f. 1. 1696). Plukenet's specimen was from Bobart, but its source is not indicated except by the descriptive term *halepense*, from which it may be surmised that Aleppo or Haleb, Asia Minor, is its original source. Plukenet's crude figure shows an awned grass, which in the absence of any evidence to the contrary may well be Johnson-grass.

Andropogon arundinaceus Scop. Fl. Carn. Ed. 2, 2:274. 1772. Specimen from a field in "Tergestino," Carniola. Scopoli, however, cites older polynomial synonyms of Linnaeus and of Scheuchzer.

Andropogon halepensis Brot. Fl. Lusit. 1:89. 1804.

Sorghum halepense Pers. Syn. 1:101. 1805.

Sorghum dubium Koch, Linnaea 21:443. 1848. Original specimens from Caucasia, found growing with *A. halepensis*. The plants were diseased, being infested with a smut, which probably accounts for the differences noted by Koch.

Andropogon dubitatus Steud. Syn. Pl. Glum. 1:394. 1854. A change of name for the preceding on account of the earlier *Andropogon dubius* Kunth.

Sorghum halepense latifolium Willk. & Lange Prodr. Fl. Hisp. 1:48. 1861.

Andropogon sorghum halepensis genuinus Hack. in DC. Monogr. Phan. 6:502. 1889.

Perennial, with extensively creeping white rootstocks 30 to 90 cm. long which penetrate to a depth of 30 to 90 cm., the scaly sheaths about equalling the internodes; culms green except the purple nodes, erect, terete, glabrous or slightly waxy below the nodes, 1–2 meters tall, mostly simple, pubescent only at the more or less constricted nodes; internodes 7–9; sheaths smooth or the collar pubescent, those of the culm terete, mostly shorter than the internodes, those of the innovations compressed; blades linear, 30–60 cm. long, 10–20 mm. wide, attenuate-acuminate, flat, the white midvein conspicuous, the margins scabrous; ligule rounded, 1–3 mm. long, ciliolate, pubescent on the back, membranaceous; panicle 10–40 cm. long, well exserted, erect or suberect, oblong to subpyramidal, rather open, the rachis glabrous except on the scabrous angles; rays mostly in whorls of 2–8 in 5–10 sets, ascending, the longer ones half as long as the panicle, mostly naked for the lower ⅓–½, scabrous on the margins, pubescent at the enlarged base; spikelets usually in threes, often but two, rarely solitary; central spikelet sessile, perfect, the lower glume convex, with strongly inflexed sides, broadly lanceolate, 4.5 mm. long, 1.5–2.2 mm. broad, faintly 5-nerved, chartaceous except the margins near the apex, acute or often obscurely 3-toothed at apex, usually purple tinged, thinly pubescent especially along the margins and toward the base, the back becoming glabrous and shining, the nerves obscure; upper glume narrower, chartaceous, inflexed at the sides, somewhat keeled, acute, pubescent near the apex, base and margins, partly enclosed by the lower which it equals in length; sterile lemma one-fourth shorter, hyaline, deltoid-ovate with inflexed sides, truncate, ciliate on the margins, 2-nerved: fertile lemma one-half as long as the lower glume, obovate, deeply 2-lobed with diverging lobes, strongly ciliate, bearing from the back near the base a stout geniculate awn 10–15 mm. long; palea a little shorter than the lemma, oblong, obtuse, ciliate, nerveless; anthers yellow, 2.5–3 mm. long; stigmas linear, densely plumose, on styles of equal length; caryopsis brownish-yellow, oblong-obovate, 2.5–3 mm. long, convex on the back, the scutellum broadly oval more than one-half as long as the grain; lateral spikelets staminate, rarely neutral, much narrower than the perfect spikelet but of about the same length, borne on very hairy pedicels about half as long as the sessile spikelet; glumes membranaceous, strongly nerved.

Abundant in the United States, especially south of latitude 37°. Farther northward it commonly winterkills. First introduced from Turkey in 1830.

In the Old World it is native of most of the countries surrounding the Mediterranean and eastward to the Himalayas. Herbarium material has been examined from Spain, France, Switzerland, Italy, Hungary, Cilicia, Cyprus, Crete, Greece, Madeira, Canary Islands, Morocco, Algeria, Tunis, Syria, Persia, Afghanistan and the Himalayas. In India it is mostly replaced by *A. halepensis miliformis*.

The specimens from Madeira and Morocco have very dark purple spikelets.

Andropogon halepensis anatherus n. subsp.

Fertile lemma hyaline, oval, obtuse, 1-nerved, awnless; otherwise similar to *A. halepensis*.

Abundantly introduced in the United States, apparently as common as the plant with awns. In the Old World its range seems practically conterminous with that of *A. halepensis*.

Type specimen in U. S. National Herbarium collected at Marco, Florida, August, 1900, A. S. Hitchcock No. 1900.

Hackel evidently confused under the name *A. halepensis muticus* two different plants, but his citation of specimens indicates that he had in mind particularly the one which occurs in India, namely, the awnless form of *A. halepensis miliformis*.

Andropogon halepensis leiostachyus Hack. in DC. Monogr. Phan. 6:502. 1889.

Sessile spikelet awned, glabrous.

Known only by specimens from Corsica.

Andropogon halepensis miliformis (Schultes) n. comb.

Andropogon miliaceus Roxb. Flora Indica 1:276. 1820. Described from specimens grown at Calcutta from seed collected in the "mountains north of Oude," India.

Andropogon miliformis Schultes Mantissa 2:448. 1824. Change of name of the above on account of the older *A. miliaceus* Forsk.

"*Andropogon laxus* Linn. Sp. Pl. ed. Willd." 4:907. 1805. Under the above name Roxburgh, Flora Indica 1:275. 1820, describes a plant which is probably not different from his *A. miliaceus*. The plant is certainly not *A. laxus* Willd. as above cited. It has usually been called *A. laxus* Roxb.

Andropogon controversus Steud. Syn. Pl. Glum. 1:391. 1854. A change of name for the grass described as *Andropogon laxus* Linn. by Roxburgh on account of the older *Andropogon laxus* Willd.

Rootstocks very abundant, short and thick, making a dense mat; stems tall, slender, 2–3 meters high, with usually 11 nodes; leaf blades 5–15 mm. wide; panicle very large and loose, 15–60 cm. long, half as broad, the very slender branches and the tip somewhat drooping; lower and upper glumes coriaceous, becoming dark at maturity; awn 12 mm. long; caryopsis yellow-brown, ellipsoid, compressed, 2–2.5 mm. long.

Young and starved specimens are not easily distinguished from true *halepensis* but well grown panicles are always very loose and drooping. Hackel speaks of some of these Indian forms as intermediate between *halepensis* and *effusus*, but this statement refers to the panicle and is without due consideration of the rootstock character.

Stapf (Hooker, Flora Brit. India 3:182. 1897) considers that there are two forms in India, one with the sessile spikelets $\frac{1}{7}$ to $\frac{1}{5}$ inch long

(*A. miliaceus* Roxb.) the other with the sessile spikelets $\frac{1}{5}$ to $\frac{1}{4}$ inch long (*A. laxus* Roxb.)

The following specimens are all in the herbarium at Kew: Chenab River, Punjab, *Thompson*, Nov. 1846; India, *Herb. Wight*, No. 1673; Punjab, *Thompson;* Mehannddee, below Muldah, *Hooker* and *Thompson*, 11 | 5 | 50; Afghanistan, Bolan Pass, *Griffith;* Khoondas, Nilgiri Hills, *Hohenacker*, No. 1284; Howrah, *J. D. Naske*, No. 1317; Monghyr, *Mekim*, No. 1402; Assam, *Fielding;* Kashmir, *V. Jacquemont*, No. 6561; H. I. No. 8778.

Under cultivation at Arlington, Farm, Va., this grows to a much greater size than *A. halepensis* (*genuinus*) and differs conspicuously in its larger looser panicles. The rootstocks are extraordinarily abundant, short and thick, forming a dense tangled mass.

The cultures of this subspecies were from seed collected by A. C. Hartless at Saharanpur, India.

Andropogon halepensis muticus Hack. in DC. Monogr. Phan. 6:502. 1889.

Awns wanting, otherwise as in *A. halepensis miliformis.*

Hackel included under the name *A. halepensis muticus* both the plant here considered and *A. halepensis anatherus.* His references are however primarily to the awnless plant of India.

The following specimens are in the herbarium at Kew: Ceylon, *Thwaites* No. 2484; ——— *Herb. Griffiths* No. 6825; Chumba 3000 ft. alt. *C. B. Clarke;* Rawul Pindee, *J. E. T. Aitchison* No. 116, Aug. 1870; Kumaon, *Strachey & Winterbottom* No. 2; Nahan, *V. Jacquemont* No. 2518; Mustafabad, Punjab, *Thomson;* Bhyrowal, 45 mi. east of Lahore, *Thomson?* No. 1542; Timmoo Ghat, *Thomson*, Oct. 1846.

This plant was apparently confused by Hackel with *propinquus* also, as under the latter name he cites a specimen from Ceylon collected by Trimen. Specimens grown in the Botanic Garden at Durban, Natal, *J. Medley Wood*, Nos. 6000 and 6675 (Kew) clearly belong here; one collected in Abyssinia by *Figari* is apparently the same.

Andropogon halepensis propinquus (Kunth) Hack.

Andropogon affinis J. S. Presl in C. B. Presl Rel. Haenk. 1:343. 1830. Specimen from Luzon.

Andropogon propinquus Kunth Enum. 1:502. 1833. Change of name due to the older *A. affinis* R. Br.

Andropogon halepensis propinquus Hack. in DC. Monogr. Phan. 6:503. 1889.

Perennial, but producing only a few stout rootstocks, 15 to 30 cm. long, sometimes 1 cm. in diameter; culms several to many, stout, 2–3 or under cultivation 5 meters high, and 0.5–3 cm. in diameter; nodes 15–26; leaf blades 3–5 cm. broad, 30–100 cm. long, sparsely appressed-pubescent at the collar, and loosely pubescent on the swellings at the base above; ligule very ciliate; panicle large, densely flowered, 20–60 cm. long, the

slender branches ascending; rays and their lower branches very pubescent at the thickened bases; spikelets dark purple or less commonly pale, unawned, readily deciduous, the sterile on pedicels more than half the length of the fertile; lower glume membranaceous, elliptic, 4 mm. long, 1.8 mm. wide, 7-nerved, green or straw-colored when mature; upper glume coriaceous, chestnut-colored and shiny when mature; anthers 2 mm. long; caryopsis yellow, obovoid, 1.5 mm. long.

This subspecies is very different from those above discussed in its much coarser stems and broader leaves, in which respect it more closely resembles the cultivated sorghums. The innovations are all extravaginal and mostly short, but stout elongated rootstocks are occasionally formed. The blossoms appear much later than in *A. halepensis* (*genuinus*); indeed it does not reach bloom at Washington, D. C., at the time it is killed by frost, but the rootstocks survive the winter. At Biloxi, Miss., plants two years old do not bloom until the end of October.

Originally collected by Haenke in Luzon. Abundant near Manila, whence the seed was received to cultivate the plant. Specimens examined: Davao, Mindanao, *Copeland* No. 466; Arayat, Luzon, *Merrill* No. 1468; P. I., *Loher* No. 7169, 7209; Luzon, *Cuming* No. 569; Balabac, *Vidal* No. 3996; Los Banos, Luzon, *Elmer* No. 8287; Novaliches, Luzon, *Loher* No. 1806; Montalban, Luzon, *Loher* No. 1807; Buru, *Reidel;* Borneo, Bangamassing, *J. Motley* No. 444; Borneo, Sarawak, *Beccari* No. 3924. The specimens from Borneo drop their spikelets very readily. Hainan, *Henry* No. 8295; North River near Canton, *Hance* No. 4879; Tai Fu, *C. Ford* No. 484. These three Chinese specimens are somewhat ambiguous toward *siamensis*.

Andropogon halepensis siamensis n. subsp.

Closely allied to *propinquus*, differing only in the larger spikelets 4.5 to 5 mm. long.

Cambodia, Pnum Penh, *Godefroy-Lebeuf* No. 83, Oct. 1878 (Kew); Siam, Pak Bawag, *Kerr* No. 2006, Sep. 4, 1911 (Kew); Siam, near Kampang, *Kerr* No. 2156, Oct. 11, 1911 (Kew) (type) "12–15 ft. high; growing in pampas along banks of Mei Ping river."

From *propinquus* this is easily separated by its much larger spikelets and from *muticus* by the larger size, broader leaves and larger more densely floriferous panicle.

Andropogon sorghum (L.) Brot.

Holcus sorghum L. Sp. Pl. 1047. 1753. Based on descriptions of cultivated sorghums by Bauhin and other writers. From the various synonyms cited by Linnaeus, his conception of the species in 1753 included only varieties with the lemmas awned, but with the glumes glabrous or villous and the grains yellow or white. By tracing the synonyms given by Linnaeus it is seen that his species included not only the sorghum with yellow seed and smooth glumes then as now cultivated in southern Europe and supposed to be from India, but also one, perhaps two,

Arabian varieties with flat white seeds and villous glumes, one of which is surely the same as or very similar to white durra.

Andropogon sorghum Brot. Fl. Lusit. 1:88. 1804. Based on Holcus sorghum L.

Andropogon sorghum is best differentiated from *A. halepensis* by the absence of rootstocks. All other characters that have been used break down completely. Thus the persistence of the spikelets in *Andropogon sorghum* as contrasted with their ready disjunction in *Andropogon halepensis* does not hold in several of the wild races (*virgatus*, *eichingeri*, *verticilliflorus*) and in some cultivated varieties the spikelets also shatter readily.

Andropogon sorghum is a much more diverse species than is *A. halepensis*. The species so far as the wild forms are concerned is apparently limited to the African continent south of the Sahara Desert, except in Egypt where it occurs to the mouth of the Nile, and Madagascar and the neighboring islands. In Tahiti occurs a race known as Toura grass not identified with any of the African sub-species, but it is doubtful if Toura grass is native in Tahiti. Still more doubtful is the scanty material from Australia. Some of the Australian specimens are undoubtedly introduced *A. halepensis*, but others scantily represented are not identified with any known form of either *A. sorghum* or *A. halepensis*. It is therefore possible that races of *Andropogon sorghum* are native to Australia and even to Tahiti.

Eleven wild races or subspecies are here described. The more marked of these such as *exiguus*, *hewisoni* and *vogelianus* are very distinct, but others such as *sudanensis*, *verticilliflorus* and *effusus* seem connected by intermediate forms. It is entirely probable when ample material is available from the vast continent of Africa, that many more often illy defined races will be found to occur. It is perfectly clear that the species as a whole is a remarkable assemblage of races and that much further investigation is necessary to determine definitely which of these races were brought into cultivation by the negroes thus giving rise to the long series of cultivated varieties.

Key to the Wild Subspecies of *Andropogon sorghum*.

Culms slender, rarely exceeding 6 mm. in diameter; sheaths mostly shorter than the internodes; panicles loose.

Panicle long and narrow, the rays strongly ascending or nearly erect.

Lower glume of fertile spikelet narrowly lanceolate, 9–11 nerved, nearly glabrous on the back . . . . . *exiguus.*

Lower glume of fertile spikelet ovate-lanceolate, 7–9 nerved, very hairy . . . . . *eichingeri.*

Panicle broad, the rays spreading.

Leaf-blades narrow, rarely as much as 15 mm. broad; panicle branches ascending-spreading; lower glume 6–7 mm. long, nearly glabrous on the back . . . . . *sudanensis.*

Leaf-blades broader, often 2–3 cm. wide.

Panicle branches ascending; lower glume lanceolate, 8–9 mm. long . . . . . *vogelianus.*
Panicle branches usually nodding; lower glume smaller, 5–7 mm. long.
Lower glume elliptic-lanceolate, 6–7 mm. long; awns short or wanting . . . . . *effusus.*
Lower glume lanceolate to ovate-lanceolate, 5–6 mm. long; awns 12 mm. long . . . . . *verticilliflorus.*

Culms stout, usually 1 cm. or more in diameter; sheaths mostly longer than the internodes; panicles rather dense.
Spikelets falling readily, the glumes very hairy on the back at least when young.
Lower glume elliptic-lanceolate, 6–7 mm. long; awns 20–25 mm. long; panicle spreading at top . . . . . *abyssinicus.*
Lower glume broadly ovate.
Panicle oblong, not very dense; lower glume 6.5–8 mm. long *cordofanus.*
Panicle fusiform, very dense; lower glume 5.5 mm. long *hewisoni.*
Spikelets persistent, the glumes not very hairy on the back even when young.
Lower glume ovate, very convex, 4–5 mm. long, 7-nerved . *niloticus.*
Lower glume elliptic-lanceolate, not very convex, 5–6 mm. long, 11-nerved . . . . . *drummondii.*

Andropogon sorghum exiguus (Forsk.) n. comb.

Holcus exiguus Forsk. Fl. Aeg.-Arab. 174. 1775. Specimens collected along the banks of the lower Nile. There can scarcely be doubt that this is the same as the succeeding.

Andropogon sorghum virgatus Hackel in DC. Monogr. Phan. 6:504. 1889. The first of numerous specimens cited is Damietta, *Ehrenberg.*

Culms slender, 3–6 or rarely as much as 10 mm. in diameter, erect, usually several from the same root; internodes 5, appressed-pubescent; leaf-blades narrow, 8–12, rarely 20 mm. broad, 20 to 40 cm. long, green or somewhat purplish tinged, more or less folded, glabrous to the base; panicle narrow, erect or a little nodding at apex, 25–50 or rarely 60 cm. long, with slender erect or ascending branches, the lower 6 to 10, rarely 15 cm. long, naked near the base, less than half the length of the panicle; lower glume of the fertile spikelet slightly indurated, 7 mm. long, 2 mm. broad, narrowly lanceolate, not constricted at base, pale-green, but becoming straw-colored when fully mature, pubescent with white hairs except on the back, 9–11 nerved, the veins evident above the middle; awns 12 to 16 mm. long, geniculate; sterile spikelets 6–8 mm. long, narrowly lanceolate, but little exceeding the very hairy pedicels; caryopsis elliptic, flattened, orange-colored, 4 mm. long.

Kordofan, *Kotschy* No. 173. (Kew); Near Khartum, *Kotschy* No. 316, March 1, 1839 (Berlin), a dwarfed form with smaller spikelets; Egedeh

(=El Egeda) between Khartum and Berber, *Schweinfurth* No. 529, Oct. 20, 1868 (Kew. Berlin); Tedac (?) between Khartum and Berber, *Schweinfurth* No. 538, Oct. 19, 1868 (Berlin); Matamma, Gallabat, N. Abyssinia, *Schweinfurth* No. 1428, Oct. 19, 1865 (Berlin); between Old Dongola and Merowat, *Dr. Bromfield* No. 32, Feb. 11, 1851 (Kew) "Arab. gerou."; Cairo, *Thos. Brown* in 1914 (Washington); Cairo, cultivated, *B. G. C. Bolland* July 15, 1912 (Kew).

Exiguus is a very distinct and apparently very uniform subspecies. All of the specimens examined are from Egypt, mostly from the region about Khartum, though Hackel cites a specimen from Senegal. This subspecies has been grown for several years under the name Tunis grass, from seed obtained through Dr. L. Trabut of Algeria, who writes that he secured it originally from Egypt. Under cultivation *exiguus* crosses naturally with *sudanensis* and with such cultivated varieties as Amber. The readiness with which *virgatus* sheds its spikelets does not recommend it for cultivation and there is no reason to believe that any of the culture forms of sorghum are derived from it.

Andropogon sorghum eichengeri n. subsp.

Culms slender, not over 3 mm. thick, about 1 meter tall; leaf-blades bright green, 1–2 cm. broad, 10–20 cm. long; nodes glabrous; panicle erect, very narrow, scarcely exserted, 15–20 cm. long; branches erect, the longest about half the length of the panicle; fertile spikelets promptly deciduous; lower glumes ovate-lanceolate, acuminate, 7 mm. long, 7–9-nerved, densely covered with appressed silvery hairs; awns 25–27 mm. long; sterile spikelets narrow, glabrous, on very hairy pedicels.

A very distinct subspecies, collected by *Eichenger*, No. 3365 (type) at Buiho, German East Africa, in wet places, June, 1911 (Berlin).

Andropogon sorghum sudanensis n. subsp.

Culms relatively slender, 2 to 3 meters tall, rarely more than 6 mm. thick, usually many from the same root; nodes 9, appressed-pubescent; leaf-blades narrow, bright green, 15 to 30 cm. long, 8 to 12 mm. broad, flat or nearly so; panicle erect, ovate-pyramidal 15 to 30 cm. long, about half as broad; panicle branches slender, flexuous, ascending-spreading, subverticillate in 5 to 8 whorls, the longest about half as long as the panicle, naked for the lower half or third, nearly glabrous at the nodes; lower glume of fertile spikelet elliptic-lanceolate, faintly 11-nerved, coriaceous, slightly shiny, glabrous except for a few hairs at the base and toward the margin, straw-colored or rarely black when mature, 6 to 7 mm. long, 2 to 2.5 mm. broad, slightly constricted above the callus; awns 15 mm. long; sterile spikelets strongly nerved, very narrow, persistent, on hairy pedicels nearly as long; caryopsis oval, flattened, orange, 4 mm. long.

Type specimen grown at Arlington Farm, Virginia, from seed secured from R. Hewison, Esq., Khartum, Anglo-Egyptian Sudan. Mr. Hewison writes that the grass is cultivated under the name *garawi*. This same

name or its variant *gerau* is used in lower Egypt for *A. sorghum virgatus*. Mr. Hewison writes that he does not know this form as growing wild.

In the United States this subspecies has been found very valuable as a hay grass, and it is now extensively cultivated in the semi-arid regions under the name Sudan-grass.

Specimens definitely referable to *sudanensis* are the following: Aegyptia superior, *Seeber* (Kew); Cairo, collector unknown (Kew); Senegambia, 1837 (Kew); Kondowe-Karonga, Nyasaland, 2000–6000 ft. alt., *A. Whyte* (Kew).

A very closely similar plant is represented by the following specimen: Katagum District, Northern Nigeria, *Dr. J. M. Dalziel* No. 293, "Tall by rivers." "Dawar rafi" (Kew). This specimen differs from Sudan-grass in having the herbage paler and somewhat glaucous, the leaves broader, 15–25 mm. broad, and the fertile spikelets elliptic-lanceolate 7–8 mm. long, becoming reddish at maturity and with a transverse depression near the base. In some respects it is intermediate toward *Andropogon sorghum drummondii*.

Andropogon sorghum vogelianus n. subsp.

Stout, the culm at base of panicle 5 mm. thick; upper leaf-blade flat, 5 cm. broad, 45 cm. long, green; panicle pyramidal, very large, 50 cm. long, 30 cm. broad, erect, loose; branches subverticillate in about 10 whorls, ascending, mostly naked below the middle, the lowest one-third as long as the panicle, the nodes pilose; lower glume of fertile spikelet sessile, lanceolate, acuminate, 8–9 mm. long, 2.5–3 mm. broad, firmly indurated, faintly 7-nerved, straw-colored, persisting, smooth on the back, pilose at base and near the margins with ferruginous hairs; awns 15–17 mm. long; sterile spikelets lanceolate, strongly nerved, nearly smooth, 8–10 mm. long on shorter pilose pedicels; mature caryopsis not seen.

Type collected on the banks of the Nun month of the Niger River, *Vogel* No. 11 (Kew). The color of the hairs on the spikelets may be due to age or other causes. A remarkable plant allied to *effusus* but with stouter panicle and larger longer-haired spikelets. No other specimen seen matches the Vogel plant but the following are very similar.

Cameroon River, *G. Mann* No. 2109, January, 1863 (Kew). Leaves 2 cm. broad, pubescence of the spikelets scanty, white.

Idu, Engermi River, *J. H. Holland* No. 153, Sept. 23, 1898 (Kew). Perhaps Idume on Ngunie River. A small slender plant with leaves 1 cm. or less broad, panicle 8–10 cm. long, and spikelets awnless, otherwise like those of the Vogel plant.

Korbo, Chari River, near Lake Chad, *Chevalier* No. 9397, July 30, 1903 (Berlin). This agrees with the Vogel plant, except that the spikelets are 10 mm. long and the pubescence is white.

Waly Fluss, German East Africa, *R. Bohm* No. 101, March 2, 1882 (Berlin). Panicle 45 cm. long, 30 cm. broad, loose and open with stout spreading branches. Awns 14 mm. long. Spikelets 7–10 mm. Agrees well with the Chevalier plant.

Entebbe, Uganda, alt. 4000 ft., *Mahon* (?) in 1902 (Kew). Panicle loose and open; spikelets 7–8 mm. mostly fallen; awns 17 mm. Tip of pedicels glabrous. Probably distinct from *vogelianus*.

Below Mazzaro, Zambesi River, *Dr. J. Kirk*, March 31, 1860 (Kew). "Grows in damp places 4–8 feet high. Fruit eaten by the people in times of famine." Spikelets 7 mm. long; awns 12–17 mm. long. Panicle pyramidal and open. Agrees well with the Entebbe specimen.

Kibwezi, German East Africa, *G. R. O. Schaffler* No. 498, June 5, 1910, 1000 ft. alt. (Berlin). Spikelets 6–8 mm. long. Awns 20–22 mm. long.

Andropogon sorghum effusus Hackel.

Andropogon arundinaceus Willd.: L. Sp. Pl. Ed. 4. 4:906. 1805. Not Scopoli, 1772. Based on a plant collected by *Isert* in Guinea.

Rhaphis arundinacea Desv. Opuscula 69. 1831. Different generic reference for *Andropogon arundinaceus* Willd.

Andropogon sorghum effusus Hackel in DC. Monogr. Phan. 6:503. 1889. In Hackel's conception, *Andropogon sorghum effusus* is based on the combined characters of two subvarieties, namely, subvariety *aristatus* with the awn 7–9 mm. long for which are cited the following synonyms: *Andropogon arundinaceus* Willd.; *Rhaphis arundinacea* Desv.; *Tracypogon avenaceus* Nees; and *Sorghum halepense* Nees Fl. Afr. Austr. p. 88; and subvariety *submuticus* with the awn barely protruding, to which is referred *Holcus decolorans* Willd. (*Andropogon decolorans* H B K.). Hackel's citations of specimens bear no relation to the types of the above names, the first specimen cited being *Schweinfurth's* No. 1521 from Matamma, Gallabat, which specimen Hackel mentions on the following page as ambiguous between *effusus* and *aethiopicus*. The references to *Holcus decolorans* Willd. and *Trachypogon avenaceus* Nees are to plants described from American specimens.

Holcus decolorans Willd.: L. Sp. Pl. Ed. 4. 4:931. 1805. Specimens from "America meridionali," apparently those from which *Andropogon decolorans* H B K. was later described.

Andropogon decolorans H B K. Nov. Gen. 1:190. 1815. Based on specimens collected between Cumana and Bordones, Venezuela. As Willdenow's description of *Holcus decolorans* is cited, that is evidently based on the same collections. The plant is indicated to be perennial.

Sorghum decolorans R. & S. Syst. Veg. 2:838. 1817. New generic reference for the above.

Andropogon avenaceus H B K. Nov. Gen. 1:189. 1815. Described from specimens collected at Havana and Regla, Cuba. The citation by H B K. of the name *Andropogon avenaceus* Schrad. is an error as at the place cited Schrader describes only *Andropogon arundinaceus* Scop.

Trachypogon avenaceus Nees in Martius Fl. Bras. 2:354. 1829. Different generic reference for *Andropogon avenaceus* H B K.

There is reason to doubt Hackel's reference of *Holcus decolorans* Willd. to *effusus* as all the specimens in the U. S. National Herbarium from Cuba, including some from the vicinity of Havana, are *Andropogon*

halepensis. For the same reason there exists doubt as to the identity of *Andropogon avenaceus* H B K. as that is based on specimens from Venezuela, from which country only specimens of *Andropogon halepensis* exist in the U. S. National Herbarium. *Trachypogon avenaceus* Nees was used with especial reference to specimens from Brazil where *effusus* is abundant, and therefore there is not the same reason to doubt Hackel's disposition of this binomial.

Culms tall, 2–3 meters or more, stout; leaves flat, 2–4 cm. broad, bright green; panicle large, 30–50 cm. long, loose, oblong to ovate or pyramidal, somewhat nodding; branches slender, subverticillate in 5 to 8 whorls, ascending or sometimes spreading, the lower ones half as long as the panicle, pilose at the nodes; lower glume of fertile spikelet elliptic-lanceolate, 6–7 mm. long, 2 to 2.5 mm. wide, 7-nerved, slightly coriaceous, somewhat constricted at base, straw-colored and falling easily when mature, covered with a white or fulvous appressed pubescence or glabrate on the back; awns 7–9 mm. long, but short-awned and awnless forms also occur; sterile spikelets narrowly lanceolate, often purplish, nearly glabrous, strongly nerved, 6–7 mm. long, on shorter hairy pedicels; caryopsis brownish-yellow, obovoid, flattened, 3 mm. long.

This subspecies is apparently restricted in Africa to the humid region surrounding the Gulf of Guinea. In America it occurs in Brazil and Cuba, probably introduced with slaves. The type is Willdenow's original specimen of *Andropogon arundinaceus* which came from Guinea. We have not seen this specimen but follow the conclusion of Hackel who bases upon it his *Andropogon sorghum effusus* subvariety *aristatus*.

The following specimens have been examined:

Spikelets with Long Awns (subvar. *aristatus* Hackel).

S. Thome, *Moller* No. 150, June, 1885 (Kew); Kamerun, Ossidinge, *Dr. Mansfeld* No. 8 (Berlin); Bomma (Boma), Congo River, No. 136, 5-9-74 (Berlin); Spanish Guinea Hinterland, Nkolentangan, Alcu, *G. Tessmann*, No. 257, March 5, 1908 (Berlin); Spanish Guinea Hinterland, Fan, *G. Tessmann*, No. 93, in 1907 (Berlin); Brazil, *Burchell*, No. 1632 (Cambridge); Pernambuco, *Gardner* No. 1177 (Cambridge); Brazil, Sao Joao del Ray, Minas. *Dorsett* No. 309b. under cultivation (Washington); Brazil, Lavras, Minas, *Dorsett* 213b (Washington).

Spikelets with Short Awns (subvar. *submuticus* Hackel).

Brazil, *Blanchet* No. 1962 (Washington); Brazil, near Rio Janeiro, *Wilkes Exped.* (Washington); Fernando Po, *Mann*, No. 114, Dec. 1859 (Kew); Togo, Misanohe, *Baumann*, No. 151, 5 IV 94 (Berlin); Nupe, Niger Banks, *Barter* No. 170 in 1858 (Berlin); Mav-Tchufi, Kamerun, *C. Ledermann* No. 4180 (1909) (Berlin). Nun mouth of Niger, *Vogel* No. 50 (Kew). The last specimen is peculiar in that the fully mature spikelets are black, and indurated.

Spikelets Without Awns.

Nupe, Niger Banks, *Barter* No. 1379 (Kew): Gabon, French Kongo, *Soyaux* No. 284, 20 | 4 | 1881 (Kew) (Berlin); Gold Coast, *W. H.*

Johnson No. 799, Abusi, 17 | 9 | 1900 (Kew); Brazil, Bahia, *Dorsett* No. 38,005 (Washington); Brazil, *Gardner* Nos. 1177, 1184 (Washington).

The Ledermann specimens from Mav-Tschufi are perhaps distinct. They were collected on the sandy banks of a river and grew to a height of 3 to 4 meters, the stems as coarse as durra. Of the two sheets in the Berlin herbarium one has awns 12 mm. long; the other is awnless but otherwise indistinguishable; lower glumes 9-nerved. The branches of the panicle are shorter than in the plant of the coast. Along with these Ledermann collected under No. 4153 specimens that are perhaps hybrid with cultivated forms. The sheet in the Berlin herbarium contains two erect panicles each about 30 cm. long and 5 cm. broad. One has the spikelets pale, nearly smooth, awnless, 6 mm. long by 2 mm. broad. It much resembles *drummondii*. The other has the spikelets 6 mm. long, 3 mm. broad, densely pilose with purplish hairs, its small awn exerted about 2 mm. In general character it approaches *cordofanus*.

The occurrence of this grass in Brazil is doubtless an incident due to the slave trade. It is of interest that the only two wild forms of *Andropogon sorghum* that reached America accidentally, namely, *drummondii* and *effusus*, are both Guinea coast forms, the very region whence most of the slaves were secured. Furthermore, all the forms of *effusus*, namely, awnless, long-awned and short-awned, occur in Brazil; indeed Hackel knew the last only from that country. Hackel probably on the basis of a herbarium label states that *effusus* is cultivated in Brazil, but Dorsett found it as a spontaneous weed, only rarely cultivated. It is at the present time being tested under cultivation in the Gulf States.

Andropogon sorghum verticilliflorus (Steudel) n. comb.

Andropogon verticilliflorus Steudel Syn. Pl. Glum. 1:393. 1854.

Stems rather slender, probably never exceeding 6–8 mm. in diameter at bases, probably 1 to 2 meters tall; leaf blades flat, pale green 1–3 cm. broad; panicle loose, erect or somewhat nodding, 20 to 50 cm. long, pyramidal; branches subverticillate, in 5 to 10 whorls, slender, ascending or somewhat spreading, the lowest about half as long as the panicle, each naked for about one-third its length; lower glume of fertile spikelet lanceolate or lance-ovate, coriaceous, straw-colored, or at length somewhat reddish, not constricted at base, 5–6 mm. long, 2 mm. wide, 7-nerved, moderately persistent, glabrous on the back, pubescent near the margins with white hairs; awns 12 mm. long; sterile spikelets narrow, strongly nerved, glabrous, as long as the fertile on shorter hairy pedicels.

Steudel's original specimen was from the island of Bourbon. The following are doubtless the same: Mauritius, *M. Bonton*, 1864 and 1865. "Naturalized abundantly in the forests and valleys." Flowers Dec. to May (Kew); Rodriguez, *M. Bouton*, "G73" 1864–5 (Kew); Rodriguez, *Dr. I. B. Balfour*, 1874 (Kew); Bourbon, *Dr. I. B. Balfour*, 1875. Stems at base of specimens 5–6 mm. thick (Kew); Mohilla Island (Comoro Islands), *Dr. J. Kirk*, April, 1861 (Kew); Johanna Island (Comoro

Islands), *J. M. Hildebrandt*, June-Aug., 1875 (Kew. Berlin); Mahe, Seychelles, *G. Neville*, 1887 (Kew).

The Balfour specimens (rather mature) both shed the spikelets like Tunis grass from a well formed scar or cicatrice; the other specimens do not usually form a scar.

Specimens from Madagascar collected by *Rev. R. Baron*, 2385, Dec. 1883 (Kew), 4568, Dec. 1885 (Kew), have the fertile spikelets only 5 mm. long, and are a trifle more pubescent.

A specimen in the Kew herbarium collected by *A. Cunningham* in Australia before 1862 is doubtfully referred here.

Most of the material from southeast and south Africa is very similar to the insular plant, but none of it identical. Four forms may be distinguished, one from German East Africa, a second from about Mount Kilimanjaro, a third from the eastern and southern portion of South Africa, i. e., Natal, Transvaal, the coast of Cape Colony, etc., and a fourth from the drier regions to the westward.

The material from German East Africa differs in having the pubescence on the spikelets longer and looser. Among the specimens examined are: Tunungus, Ger. E. Africa, *Stuhlmann* No. 8692 (Berlin); Werawa, Rukingo, Ger. E. Africa, *Stuhlmann* No. 6091, Feb. 15, 1894 (Berlin); Usambara, Ger. E. Africa, *Dr. J. Buchwald* No. 509, Dec. 28, 1896 (Berlin); Kavirondo, Br. E. Africa, 6th day from Mumias, *A. Whyte*, Dec. 12, 1898 (Kew); Ger. E. Africa, *Busse* No. 140 (Kew); Kwa-Wasiri, Uzeguha, Ger. East Africa, *W. Busse* No. 171 (1900). Busse makes the following notes on No. 171: found growing about sorghum fields; natives name "lumbolo." "Diese Pflanze ist im Gabi Sud der cultivierte sorghum sehr ahnlich, nur durftiger als dass; vielleicht die durch aberwilderung wiedergewonnen Urform von *Andropogon sorghum?*"

Specimens from the vicinity of Mt. Kilimanjaro have decidedly larger spikelets, 6–7 mm. long, but otherwise seem indistinguishable. Such specimens are: Kilimanjaro & Meru near Mebula, *Dr. C. Uhlig*, No. 855, Dec. 18, 1901, 1200 m. alt. with leaves 1 to 2.5 cm. broad and spikelets mostly fallen, those remaining 5–7 mm. long (Berlin); Kilimanjaro, Moshi, *Morder?* No. 386, April, 1904 (Berlin), with leaves 3 cm. broad.

The two following specimens have narrow leaves and small, rather narrow panicles, but the spikelets are very similar: Kilimanjaro, 1100–1200 m. alt. *Dr. R. Endlich*, No. 41, Nov. 1908 (Berlin). In "Mischwald und Baumsteppe"; leaves 1.5 cm. broad; Kilimanjaro, Marangu, *G. Volkens* No. 1477. Dec. 8, 1893 (Berlin). In wet places, scattered; leaves, even the basal ones, narrow, 6–10 mm. wide.

The plant of the moister portions of Africa south of latitude 28° differs from typical *verticilliflorus* in having the narrow leaves 1 to 2 cm. broad; a smaller and looser panicle, and usually purple-tinged, slightly larger spikelets, 5–7 mm. long. Here belong the following specimens: without locality, *Drege*, Hb. Nees No. 4240 (Berlin); Natal, Banks of Tugela, *Buchanan*, No. 296 (Kew, Berlin); Bet. Shupango & Senna, *Dr. J. Kirk*, Jan. 1859 (Kew); Kongone mouth of Zambesi, *Dr. J. Kirk*, Jan. 1859 (Kew); Natal, Umlazi River, *Krause* No. 184 (Kew); Natal,

W. T. Gerrard No. 690 (Kew); Natal, Umhlanga, *J. M. Wood* No. 1332 (Kew); Pondoland, *F. Bachmann*, No. 207, in 1888 (Berlin); Melville, *Burchell*, No. 5465, June 8, 1814 (Kew). Two specimens at Kew are labelled "Tabucki grass from the Cape," one "ex herb. Rottlerianum" probably collected by Thunberg; the other "ex herb. Wight" perhaps grown in India. This is apparently the grass to which the nomen nudum *Andropogon tumbackianus* Roxburgh Fl. Indica 1:276, 1820, was meant to apply.

In the drier interior and western parts of South Africa the panicle is decidedly more purplish, even the hairs on the spikelets and pedicels being reddish. These differences are perhaps wholly due to climatic influence. Among such specimens are the following: Orange River near Verleptram, Little Namaqualand, *Drege* (Kew); Grootfontein Nord, Ger. S. W. Africa, *Morgenstern* (Berlin); St. Clair, near Douglas, Herbert, *MacOwen* No. 185, Oct. 1897 (Kew) and No. 1995, 1897 (Kew, Berlin); Salisbury, Rhodesia, *E. R. Townsend* Feb. 1909 (Kew); Kyimbila (?) *A. Stolz* No. 1203, Apr. 11, 1912 (Berlin).

This subspecies has been grown in the greenhouse from seed supplied by Mr. I. B. Pole-Evans, Pretoria, Union of South Africa, from which the following notes were taken: stems slender; nodes of culm 7 to 9; leaf-blades 45–60 cm. long, 2–3 cm. wide; mature caryopsis brownish-yellow, ellipsoid, compressed, 3 mm. long.

Andropogon sorghum abyssinicus n. subsp.

Culms stout, 6 mm. thick at base of the panicle; upper leaf pale, flat, 4–5 cm. broad; panicle (young) 30 cm. long, very loose; branches slender, flexuous, ascending-spreading, strongly pilose at the nodes, the longest half the length of the panicle; lower glume of fertile spikelet elliptic-lanceolate, 6–7 mm. long, 2.5 mm. broad, 9-nerved, subcoriaceous, nerved only near the apex, quickly deciduous, constricted above the callus, covered with short white pubescence or at length glabrous on the back; awns about 20–25 mm. long; sterile spikelets narrowly lanceolate, strongly nerved, 6–7 mm. long on shorter hairy pedicels; immature spikelets pale straw-colored.

Collected at Matamma, Gallabat, Abyssinia by *Schweinfurth* No. 1521, July 25, 1865, who notes that it is "sehr haufiger Rohrgras bei Matamma" and a "mussenhaftes Unkraut in der Gärten." Type at Berlin; duplicate at Kew.

Hackel cites this as the first specimen under *effusus* (subvar. *aristatus*) but under *aethiopicus* he refers to it as intermediate between *effusus* and *aethiopicus*.

From Schweinfurth's notes it would seem uncertain whether the plant is wild or simply a weedy form of a cultivated plant.

Andropogon sorghum cordofanus (Hochst.) n. comb.

Andropogon cordofanus Hochst. Flora 27:245. 1844. Type collected in Kordofan by Kotschy (Flora aethiopica No. 54).

Andropogon aethiopicus Rupr.; Steud. Syn. Pl. Glum. 1:372. 1854. Described by Steudel from the MSS. name of Ruprecht, based on the same collection as the preceding.

Andropogon sorghum aethiopicus Hack. in DC. Monogr. Phan. 6:504. 1889. Also based on the collection of Kotschy from Mt. Arasch-Cool, Kordofan, the previous descriptions having apparently been overlooked. Hackel describes two subvarieties, namely, *longearistatus* with awns 24–32 mm. long, and *breviaristatus* with awns 5–15 mm. long, both represented in Kotschy's collections.

Culms rather stout, glaucous, 10 to 12 mm. in diameter near the inflorescence and probably much stouter at base; nodes appressed pubescent; leaves pale green and somewhat glaucous, the blades flat, rather short, 10 to 25 cm. long, 10 to 25 mm. broad, glabrous at the collar; panicle ovate to oblong, 10 to 30 cm. long, erect, rather dense, the branches ascending or a little spreading, the longest only one-third the length of the panicle; lower glume of fertile spikelet 6.5 to 8 mm. long, 3 mm. broad, pale at first at length reddish, densely covered with short silvery appressed pubescence, but at maturity more or less glabrate on the back, obscurely 9–11 nerved, the nerves evident only near the apex; awns short 5–15 mm. (subvariety *breviaristatus* Hackel) or long 20 to 30 mm. (subvariety *longearistatus* Hackel); sterile spikelets lanceolate, sparsely pubescent, strongly 9-nerved, 7 mm. long, the very hairy pedicels only a little shorter; stamens well developed; mature caryopsis not seen.

Kordofan, Mt. Arasch-Cool, *Kotschy* No. 158, Oct. 10, 1839 (Berlin. Washington). This is the type of Hackel's subvariety *breviaristatus* and almost certainly the same as *A. cordofanus* Hochst.

All of the remaining specimens belong to subvariety *longearistatus:* Kordofan, Mt. Arasch-Cool, *Kotschy* No. 390, Oct., 1839 (type) (a specimen of *virgatus* on this sheet in Kew Herbarium) (Cambridge); Aethiopia, *Kotschy* No. 132 (Kew); Blue Nile, *C. L. Muriel*, Aug. 11, 1900. Tall reedy grass 10 ft. high. Arab. "Arda." (Kew); Wadi Eremit, between Suakin and Berber, *Schweinfurth* No. 655, Oct. 5, 1868 (Berlin); Omdurman, *Dr. R. Hartmann*, June, 1860—Abnormal smutted specimen (Berlin).

The two specimens collected by Hartmann are both abnormal, being infested with smut. They were referred to by Schweinfurth (Plantae Quaedam Niloticae, p. 43, 1862) who considered them referable to *Sorghum crupina* Link.

This subspecies in its typical form seems confined to upper Egypt in the region surrounding Khartum. It seems much subject to infection by a smut (*Sphacelotheca sorghi*) which produces an abnormal inflorescence.

Specimens collected in Sudan by *H. M. & A. F. Brown* No. 1473 (Kew) are very close to typical *cordofanus*, differing mainly in the shorter awn and the lateral spikelets. Under cultivation in the greenhouse this produces 17-jointed stout culms 2–3 meters high; leaf-blades 50 to 100 cm. long, 3–5 cm. broad; panicle oblong-ovate, rather close, 20–30 cm. long, with ascending branches; spikelets readily deciduous at maturity; fertile

7 mm. long; awn 13 mm. long; sterile very narrowly lanceolate, and without trace of stamens.

Hackel refers to *aethiopicus*, a specimen collected in Darfur by *Dr. Pfund*. This specimen is a panicle only with broadly lanceolate spikelets hairy only near the margin, shiny on the back and at maturity black. Awns 12 to 15 mm. long. It seems impossible to include it in *cordofanus*, but it is more nearly allied there than to other forms. It may be a cultivated plant or a hybrid with such.

Still more doubtful is a specimen from Damaraland collected by *Marloth* near the hot springs called Barmen. This plant has the same pale herbage as *cordofanus*, but the leaves are narrower and longer and the culms apparently more slender. The spikelets are narrower than those of *cordofanus*, dark purple covered with a purplish pubescence, except a small area on the back. Awns 16 mm. long. Additional material will probably show this to be distinct.

Andropogon sorghum hewisoni n. subsp.

Culms stout, several to many from the same roots, erect, 1–3 cm. in diameter, 3–3.5 meters tall, somewhat waxy coated; nodes 13 to 19; leaf blades 70–100 cm. long, flat, 4 to 8 cm. broad, the sheaths mostly longer than the internodes; panicle barely exserted from the uppermost sheath, very compact, somewhat fusiform, thickest in the middle, 10–15 cm. long, 3–4 cm. thick, the longest branches about one-third as long as the panicle; spikelets moderately persistent; lower glume of fertile spikelet broadly ovate or oval, 5.5 mm. long, 3 mm. broad, 9–11-nerved, densely covered with white hairs, green except the chestnut-red base; awns 11 mm. long, smooth to the elbow, scabrous above; lateral spikelets narrowly lanceolate, hairy, without stamens; caryopsis brownish-yellow, obovoid, compressed, 3.5 mm. long.

Grown in the greenhouse from seed collected by *R. Hewison, Esq.*, in Sennaar Province, Sudan, "obtained from wild plants."

At Arlington Farm, Virginia, the plants grew to a height of 2 to 2½ meters but did not bloom by the time of killing frosts. It is therefore decidedly a long season plant.

This subspecies strongly suggests *cordofanus* but the heads are much more dense, the awns smaller and the lateral spikelets without stamens. It is even more closely allied to the specimen collected by Brown in Sudan referred to under *cordofanus* but that has loose panicles, and spikelets that drop very readily. The dense heads suggest the possibility of its being a cross with a cultivated variety of durra, but it does not seem that this is probable.

Hewisoni may be the wild original of the durras as the pubescence in the spikelets suggests. This origin would be consistent with the restriction of the true durras in Africa to Egypt and Sudan and with their absence from other parts of that continent.

Andropogon sorghum niloticus Stapf in herb. n. subsp.

Culms tall, stout, 4 mm. thick at base of panicle; leaf blades flat, the

upper 2 cm. broad; panicle narrowly oblong, erect or a little nodding near the top, 15 to 40 cm. long; branches slender, ascending, the longest about half the length of the panicle, all naked toward the base; lower glume of fertile spikelet coriaceous, ovate, very convex, constricted at base, nerved near the tip, smooth and shiny on the back, hairy at base and on the margins, straw-colored but apparently becoming reddish at maturity, 4–5 mm. long, 2–2.5 mm. broad, faintly 7-nerved; awns 10–12 mm. long, or in one panicle wanting; sterile spikelets very narrow, longer than their hairy pedicels. The sterile spikelets drop early but the fertile are persistent, apparently as much so as in cultivated forms.

Banks of White Nile a little south of Gaba Shambe, intermingling with other grasses but much taller, *Consul Petherick*, June 25, 1862 (Kew).

This subspecies is clearly allied to *cordofanus*, but differs in its larger looser panicles and smaller spikelets.

What may be the same subspecies has been collected on Ruwenzori by *G. F. Scott Elliott* No. 7612 (Kew). The specimen is slender about 60 cm. high, with leaves 1 cm. broad, and a somewhat secund panicle 16 cm. long. The spikelets are orange-red but very similar in form to the Petherick specimen.

Andropogon sorghum drummondii (Nees) Hackel.

Andropogon drummondii Nees; Stendel Syn. Pl. Glum. 1:393. 1854.
Andropogon sorghum drummondii Hackel in DC. Monogr. Phan. 6:507. 1889.

Culms about 2 meters tall, commonly solitary or but few from the same root, stout, often 1 cm. or more in diameter; leaf blades pale, flat, the upper 2 to 4 cm. broad, 40 to 50 cm. long; panicle pyramidal-oblong, erect, commonly 30–40 cm. long, rather dense; branches ascending, the lower about one-fourth the length of the panicle, naked at base; lower glume of fertile spikelet elliptic to ovate-elliptic, very coriaceous, nerved for the upper third, distinctly constricted at base, 5–6 mm. long, 2–2.5 mm. broad, 11-nerved, glabrous on the back, sparsely pubescent near the margins, persistent, straw-colored but often becoming reddish at maturity; sterile spikelets narrow, about 3 mm. long on hairy pedicels of about the same length; grain oval, flattened, 4 mm. long, orange-colored.

This subspecies was originally described from specimens collected by *Drummond* at New Orleans in 1832. Those preserved at Kew are very young small plants with the panicle just emerging. In Louisiana and Mississippi this plant has long been known as "chicken-corn," it appearing spontaneously each year in cultivated ground. In recent years it has become scarce due probably to the work of the sorghum midge. Chicken corn is very similar to cultivated varieties of sorghum. The stems contain no sugar. The constriction at the base of the fertile spikelet is a very constant character, but occurs in some other wild sorghums.

Chicken-corn was undoubtedly brought to America by negro slaves, perhaps accidentally. African specimens have been examined as follows:

Sokoto, Northern Nigeria, *Dr. J. M. Dalziel* No. 518, the native name "Kerama" (Kew); Senegal, *Roger* in 1823 (Kew).

Specimens collected at Kouroussa, French Guinea, *M. Pobequin* No. 539, Dec., 1900 (Kew) are very similar, but the panicle is secund drooping and the spikelets black at maturity. It is perhaps a cultivated variety as it is labelled "Mil sauvage."

Hackel mentions typical specimens from Nupe on the Niger, collected by *Barter*. He also cites cultivated specimens from Dahomey, Mexico and Carolina. There are specimens in the U. S. National Herbarium from Yucatan and Guatemala.

The plant is apparently confined to the general region of the Niger, and perhaps is not a really feral form, but one modified by cultivation. At any rate, it is more closely similar to some cultivated varieties than any undoubted wild form as yet known.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW NORTH AMERICAN DIPTERA.

BY J. R. MALLOCH.

In this paper I have described four new species of Diptera, the types of three of which are in the collection of the Illinois State Laboratory of Natural History. The type of *Chironomus macateei* is in the collection of W. L. McAtee, Washington, D. C.

Chironomus macateei and *Metriocnomus annuliventris* belong to Chironominæ, *Sapromyza littoralis* to Sapromyzidæ, and *Meoneura nigrifrons* to Milichinæ, a subfamily of Agromyzidæ.

The figures of the hypopygia present one side only, viewed from above.

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Chironomus macateei n. sp.

Male.—Pale yellow, subopaque. Antennal flagellum pale brownish, plumes and palpi yellow. Abdomen yellowish, green at base, yellow on apical half, seventh segment and basal portion of hypopygium black. Legs yellow, the hind tibiae with the usual black apical comb, wings clear, veins pale yellow, cross vein clear. Halteres yellow. Hairs on body and legs whitish yellow.

Frontal tubercles indistinguishable; antennae elongate, about 1½ times as long as head and thorax together. Hypopygium as Figure 1, the inferior process much elongated. Legs slender, fore tarsi without long hairs, basal joint one-fifth longer than fore tibiae (42:35), second joint one-tenth longer than third (22:20); mid and hind legs with long hairs. Wings rather broad and short, third and fourth veins ending at equal distances before and behind apex, respectively; cubitus forking distinctly, but not greatly beyond the cross vein.

Female.—Agrees with male in color except that the abdomen has only one black mark, that on the seventh dorsal segment.

Leg proportions and wing venation as in male.

Length: 3 mm.

Type locality.—Plummers Island, Md. August 10–17, 1912 (W. L. McAtee). Allotype: Maryland, near Plummers Island, July 4, 1914 (W. L. McAtee). Type and allotype are in collection of W. L. McAtee.

Named in honor of the collector in recognition of many favors received by the writer.

The species bears a superficial resemblance to *pallidus* Johannsen, which name was borne by one of the specimens. Separable by the entirely yellow legs and thorax, the differently colored abdomen and form of the hypopygium.

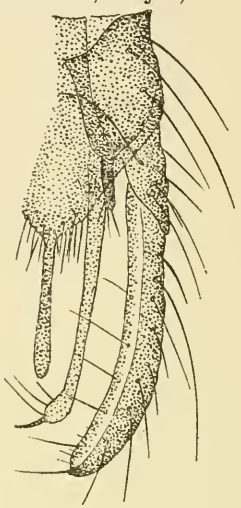

FIG. 1

Metriocnemus annuliventris n. sp.

Male.—Yellow, slightly shining. Head yellow; scape of antennae glossy black-brown, flagellum fuscous, yellow at base, plumes brown; palpi pale brown. Thoracic vittae, the greater part of sternopleura, a spot in front of wing base on pleura, and postnotum dark brown. Abdomen yellow, apices and bases of the segments conspicuously marked with black-brown. Legs yellow, mid and hind coxae brownish.

Frontal tubercles absent; antennae about 1.5 as long as head and thorax combined; palpi much longer than height of head. Pronotum rather broad, continued to upper margin of mesonotum, the latter not much produced anteriorly. Hypopygium with weak dorsal plate, the apical portion of lateral arm consisting of two processes (Fig. 2). Legs slender, mid and hind pairs with long hairs; fore tarsi without long hairs, basal joint about four-fifths as long as fore tibiae. Third vein extending to beyond beginning of curve at apex of wing and but little further from the apex than fourth vein at its apex; cubitus forking slightly beyond cross vein; surface hairs on wings rather dense.

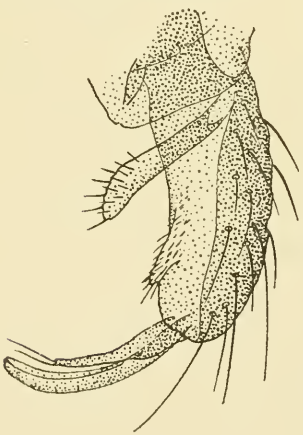

FIG. 2

Length: 4 mm.

Type locality. — Stanford University, Cal., March, 1906 (J. M. Aldrich).

This species resembles *flavifrons* Johannsen, but differs in having the apices of the abdominal segments as well as their bases blackened and in having the cubitus forking distal of the cross vein.

The present species belongs to the subgenus *Brillia* Kieffer, which is distinguished from *Metriocnemus* sen. str. by the bifid apical hypopygial

process and the well developed pulvilli. I hesitate accepting this subgenus as a valid one in the absence of females and information as to whether that sex has coordinated characters which permit of their association with the males in a subgeneric treatment of the group.

Sapromyza littoralis n. sp.

Male.—Yellow, shining. Frons opaque, entire head yellow, the arista brown. Mesonotum with very slight grayish pruinescence. Legs entirely yellow. Halteres yellow. Hairs and bristles on body black.

Head buccate in profile, the frons distinctly and obtusely produced anteriorly, face slightly receding towards mouth; width of frons one-half that of head; orbital bristles becoming shorter anteriorly, the anterior one slightly beyond middle of orbit; cheek over half as high as eye, almost bare, without distinct hair at anterior angle; eye small, slightly higher than long. Mesonotum with four pairs of strong dorso-centrals, the anterior pair distinctly in front of suture; acrostichals in two rows, reaching to a point in front of anterior dorso-centrals. Abdomen short and stout, its length not equal to that of thorax, the dorsum generally flattened; apices of all segments with distinct black bristles; hypopygium stout, not laterally compressed as in *harti;* last ventral segment with the lateral extremities drawn out into short, sharp points. Legs stout; hind femora with a group of very short black setulae on basal third of ventral surface; 1–2 bristles at near apex on ventral surface; hind tibiae without noticeable hairs, except the usual preapical bristle. Wings slightly yellowish; veins pale brown; venation as *harti.*

Female.—Agrees with the male except that the abdomen is slightly conical in shape, the last segment not noticeably constricted and the small setulae are absent from the hind femora.

Length: 3.5–4.5 mm.

Type locality.—South Haven, Mich., July 14, 1914 (C. A. Hart). Taken by sweeping on the lake shore.

The male is separable from *harti* Malloch, which it most closely resembles, by the shape of the abdomen, the presence of the small setulae at base of the hind femora and smaller number of preapical hind femoral bristles. The female is separable from that of *harti* by the shape of the abdomen, which is conical, while in *harti* the last segment is suddenly contracted. From *bispina* Loew and other species which have the wings and body without dark marks, this species and *harti* may be separated by the buccate head and comparatively small eyes.

Meoneura nigrifrons n. sp.

Male.—Glossy black. Head and its members entirely black, the frons glossy. Mesonotum without pruinescence; scutellum shining, but less glossy than mesonotum. Abdomen glossy black, slightly brownish and less glossy at base. Legs black. Wings whitish, first, second and third veins and the costal vein to apex of the latter dark brown, fourth vein colorless, fifth nearly so. Halteres black.

Frons at vertex over half the width of head; frontal triangle extending almost to anterior margin, along its margins are a few short setulae and beyond its apex on anterior margin of frons are two stronger setulae; ocellar bristles widely divergent; lower two pairs of orbital bristles incurved, upper two pairs curved outwards, between the bristles there is a short setula; antennae normal in size, second joint with distinct dorsal bristle, third joint rounded, arista shorter than anterior width of frons, slightly pubescent; cheek at anterior margin about half as high as eye; diagonal series of bristles consisting of 3–4 of moderate size. Mesonotum finely granulose, disc with numerous black setulae and two pairs of dorsocentrals, the anterior pair rather weak; scutellum more finely and densely granulose than mesonotum, and with four marginal bristles. Abdomen without hairs except on the glossy apical segment; hypopygium small, its surface with a number of short setulae. Legs normal, the fore femora with 3–4 bristles on the posteroventral surface. Costa with short setulae to apex of first vein, both the breaks distinct, second costal division about twice as long as third; third vein ending almost exactly at apex of wing; cross veins very closely approximated, not separated by more than the length of inner cross vein; last section of fifth vein three times as long as penultimate section.

Length: 1 mm.

Type and allotype.—Urbana, Ill., Sept. 6, 1914 (J. R. Malloch). Taken on a window in the basement of the Natural History Building, University of Illinois.

Separable from *lacteipennis* Fallen and *vagans* Fallen by the black frons and halteres.

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PROCEEDINGS
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A REMARKABLE NEW THRIPS FROM AUSTRALIA.

BY J. DOUGLAS HOOD,
United States Biological Survey.

The thysanopteron described below presents an interesting and truly unique modification of the last abdominal segment. In every other species of the suborder to which it belongs this segment is slender and nearly cylindrical in form, and is always termed the "tube." In the insect here described, however, it is greatly swollen and its resemblance to a tube has entirely disappeared. The species is generically and specifically new and would appear also to represent a new family. We owe its discovery to Mr. A. A. Girault, the hymenopterist.

Family **Pygothripidæ** nov.

The characters upon which this family is separated from the closely allied Phlœothripidæ are the very transverse form of abdominal segments two to nine and the structure of the tenth abdominal segment, which is not at all tubular in form but is greatly swollen, and in the single known species about parabolic in dorsal aspect.

Genus **Pygothrips** nov.
(πῡγή, the rump; θρίψ, a wood worm.)

Head much longer than wide, subtruncate in front, vertex evenly declivous; cheeks nearly straight, with a few minute, barely visible bristles. Eyes subquadrangular, larger in dorsal view than in ventral, their width about equal to the interval between them. Ocelli equidistant, anterior ocellus not overhanging. Antennæ eight-segmented, the last two segments compactly united (much as in *Trichothrips anomocerus* Hood). Mouth cone large and heavy, formed as in *Cryptothrips*, nearly attaining posterior margin of prosternum; labium rectangularly rounded at apex, subequal in length to labrum. Pronotum shorter than head and (inclusive of coxæ) more than twice as wide as long; anterior margin deeply and roundly emarginate. Legs moderately short; fore tarsi armed. (Wings wanting in the unique specimen.) Abdomen heavy; segments

very transverse, five or more times as wide as long; terminal segment (the tube) greatly swollen, parabolic in dorsal aspect, nearly as wide and thick as long.

Type.—*Pygothrips rugicauda* sp. nov.

Pygothrips rugicauda sp. nov.

(Fig. 3, a-c.)

Female (*apterous*).—Length about 1.3 mm. General color nearly chestnut brown, with pterothorax, basal abdominal segments, tarsi, distal ends of fore tibiæ, and antennal segments 1–3, paler.

Head about 1.47 times as long as width across eyes; cheeks straight, diverging to base, set with a few minute, inconspicuous bristles; postocular bristles slightly dilated at tip, about one-third as long as head; another rather prominent pair of bristles halfway between postoculars and base of head. Eyes small, about one-fourth as long as head and as wide as their interval, subrectangular as seen from above, on ventral

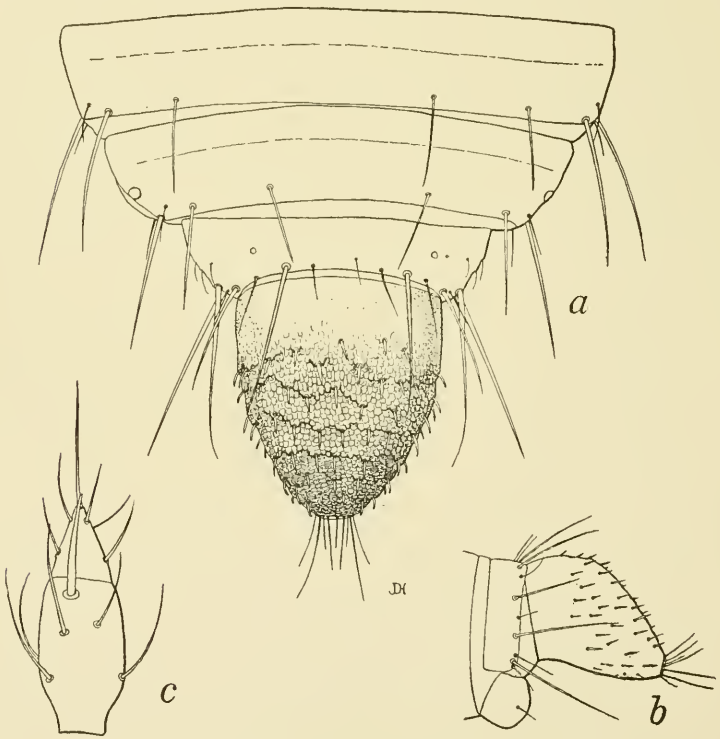

FIG. 3.—*Pygothrips rugicauda* fam. gen. et sp. nov.; female.
a. Segments 7–10 of abdomen, dorsal view.
b. Segments 9–10 of abdomen, lateral view.
c. Segments 7–8 of right antenna, dorsal view.

surface of head with their median and caudad margins forming a very acute angle. Ocelli minute, posterior pair widely separated. Antennæ about 1.6 times as long as head, formed almost as in *Trichothrips anomocerus* Hood; segment 3 clavate, about equal in length to segment 2; 4–6 oval, pedicellate; 7+8 lanceolate, pedicellate; segments 1–3 slightly paler than head, 2 paler along middle and at apex, 3 paler at base; 4–8 concolorous with head. Mouth cone large and heavy, formed as in *Cryptothrips*, nearly attaining posterior margin of prosternum; labium rectangularly rounded at apex, subequal in length to labrum.

Prothorax along median dorsal line about half as long as head and (inclusive of coxæ) about 2.9 times as wide as long; pronotum without sculpture, anterior and posterior margins nearly concentric; all usual bristles present, slightly dilated at tip, the two pairs at the posterior angles about equal in length to postoculars, others shorter. Pterothorax slightly wider than prothorax. Legs short, rather stout; fore tarsus with a rather small stout tooth.

Abdomen stout, about 1.3 times as wide as prothorax, broadest at about segment 5, thence rounded to base of last segment; segments very transverse, five or more times as wide as long. Terminal segment greatly swollen, heavily chitinized, about .83 as wide as long, parabolic in dorsal aspect; surface roughened, with scale-like thickenings and numerous stout spines (see figure).

Measurements of holotype.—Length 1.33 mm.; head, length .254 mm., width across eyes .180 mm.; prothorax, length, .138 mm., width (inclusive of coxæ) .400; pterothorax, width .432 mm.; abdomen, width .552 mm.; terminal segment, length .216 mm., width .180 mm. Antennal segments: 1, length 42μ; 2, length 63μ, width 36μ; 3, length 63μ, width 30μ; 4, length 56μ, width 35μ; 5, 60μ; 6, 57μ; 7, 45μ; 8, 20μ; total length of antenna .41 mm.

Described from one female taken at Nelson, North Queensland, Australia, August 17, 1912, by A. A. Girault, by "sweeping top of Pyramid Mt., 3000 ft., Casuriva and bushes."

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PROCEEDINGS

OF THE

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AN OUTLINE OF THE SUBFAMILIES AND HIGHER GROUPS OF THE INSECT ORDER THYSANOPTERA.

BY J. DOUGLAS HOOD,
United States Biological Survey.

Not many years ago the order Thysanoptera, when recognized at all, was known as a small group of unimportant insects. In 1907 only about 45 genera and 175 species had been recorded in the scientific literature of the entire world. During the last seven years, however, the activity of specialists has increased the number of known genera to 169 and the known species to 795. Economically, too, the group has come into greater prominence, and the Orange Thrips, Pear Thrips, and Tobacco Thrips have taken a place among the important pests of their respective food plants. The systematic and biological work have each proved a stimulus to the other, and some knowledge of these tiny insects has become necessary to every working entomologist.

With the increase in the size and importance of the group has come the necessity for a more comprehensive classification than that of Uzel, proposed in 1895. Mr. Richard S. Bagnall, in a recent paper (Bagnall, 1912b) has suggested the division of the order into three suborders, one of which he calls Polystigmata, in agreement with an opinion which had been expressed by the writer (Hood, 1912). These suborders he further divides into the nine families Urothripidæ, Phlœothripidæ, Ecacanthothripidæ, Idolothripidæ, Æolothripidæ, Heterothripidæ, Panchætothripidæ, Ceratothripidæ, and Thripidæ. Shortly after this Dr. Filip Trybom, in a paper on some Thysanoptera from Natal and the Zululand (Trybom, 1912),

places the suborder Polystigmata Bagnall as a synonym of the suborder Tubulifera Haliday, stating that in his opinion the seven extra abdominal "stigmata" ascribed to that group are not spiracles at all,—a statement which he reiterated in a letter to the writer shortly before his death, in the following words : " It seems to me that the seven extra ' stigmata ' are not real spiracular openings (see p. 35 of my named paper). For this reason I have preferred to keep the Urothripidæ as a family instead of adopting the new suborder. It may be that I am mistaken, but I have been in a position to examine several specimens " (Trybom, 1913). Trybom's paper was followed by one by Dr. H. Karny (1913), in which the Polystigmata are recognized as a valid suborder and the two additional families Megathripidæ and Hystricothripidæ proposed. In February, 1914, a twelfth family, the Merothripidæ, was proposed by the writer for the reception of an anomalous American genus. The next paper which touches on the general classification of the order was published by Mr. Bagnall in March, 1914, and in it the suborder Terebrantia is divided into two tribes, the Æolothripides and the Thripides. Finally a thirteenth family, the Pygothripidæ was erected by the writer for a remarkable Australian form (Hood, 1915).

In the classification proposed below, most of the groups just mentioned have tentatively been accepted by the writer. It seems, however, that the accurate separation of a natural group of organisms, its exact definition, the correct interpretation of its affinities, and its assignment to a true place in the phylogenetic scheme, are impossible until the knowledge of the larger group to which it belongs, and of which it forms an integral part, has become really comprehensive. When finally distinguished, it will be found that the broader groups will be separated by fundamental characters of ancient origin, while the less comprehensive groups will be distinguished by characters of less importance, produced in comparatively recent times. Thus, while we look to color, sculpture, size, and other trivial differences for the separation of species, we expect the definition of larger groups to call into service important differences in the main body itself. The separation of families on sexual characters, on minor antennal differences observed in solitary specimens, and on the relative length of the tenth abdominal

segment, can not prove very satisfactory, striking though such structures may at first appear.

It has been deemed necessary to replace the name Æolothripides with Æolothripoidea, and Thripides with Thripoidea, and to alter their designations from "tribe" to "superfamily," in accordance with accepted modern usage as established by Dr. Theodore Gill (1898). The name Polystigmata is placed as an unavailable synonym of a new superfamily (Urothripoidea) of the Tubulifera. The family Ecacanthothripidæ is here considered a synonym of the family Phlœothripidæ, its distinction having been based on what appear to be minor characters.

Finally, before undertaking the definition of the various groups under consideration, it may be interesting to note that the most generalized superfamily, the Æolothripoidea, was proportionately much more abundantly represented in the Tertiary geological epoch than at present, while the specialized Phlœothripoidea, which are now probably the most numerous of all, were then represented by only one known species. The Urothripoidea are unknown as fossils. The following table, partly from Handlirsch (1908), shows these points very clearly:

	Fossil Species			Totals	Recent Species
	Tertiary		Quaternary		
	Oligocene	Miocene	Pleistocene		
Thysanoptera	22	2	3	27	795
Terebrantia . . .	17	—	—	17	352
Æolothripoidea .	6	—	—	6	28
Thripoidea . . .	11	—	—	11	324
Tubulifera	1	—	—	1	443
Phlœothripoidea	1	—	—	1	438
Urothripoidea . .	—	—	—	—	5
(Unnamed)	4	2	3	9	—

Order Thysanoptera Haliday, 1836.

1744. Genus *Physapus* De Geer
1758. Genus *Thrips* Linné
1806. Family *Vesitarses* ou *Physapodes* Duméril
1814. Family *Thripsides* Fallén
1825. Tribe *Thrypsides. Physapi* Latreille
1829. Family *Thripidæ* Stephens
1835. Order *Thrypsites* Newman
1835. Order *Thripsites* Newman

1836. Order *Thysanoptera* Haliday
1838. Tribe *Physopoda* Burmeister
—— *Thrypsinæ* Blanchard*
—— *Malacoptera* Brullé*
1852. Order *Physapoda* Haliday-Walker
1855. Order *Thripsina* Newman
1855. Group *Thripsidæ* Fitch
1856. Family *Thripididæ* Fitch

Small, slender, usually depressed, Orthopteroid insects, generally capable of flight and frequently saltatorial, feeding on plant-saps and exceptionally on animal juices. Metamorphosis direct; penultimate instar often quiescent. Wings developed gradually and applied externally. Reproduction always oviparous, often parthenogenetic.

Head vertical, moderately movable, usually with large compound eyes and three ocelli. Antennæ slender, four- to nine-segmented. Mouth parts hypognathous, haustellate, conical, asymmetrical, consisting of a triangular labrum fused with the two pairs of maxillæ to form a sheath in which move three piercing bristles.

Prothorax free, movable. Mesothorax and metathorax united, each with a pair of stigmata. Wings often rudimentary or lacking, four in number, nearly similar, slender, with few or no veins, and closely fringed with very long hairs. Tarsi one- or two-segmented, with one or two claws, between which is a bladder-like organ.

Abdomen ten-segmented, terminal segment often tubular; first segment short, more or less united with the thorax. Ovipositor, when present, consisting of two pairs of gonapophyses pertaining to segments 8 and 9. Stigmata present on abdominal segments 1 and 8.

The writer has followed previous authors in employing the name Thysanoptera in preference to the earlier name Thripsites (or Thrypsites), because it is definitive, more satisfactorily formed, and is in general acceptance by entomologists. It has two years priority over Physopoda, which would otherwise, perhaps, be a more satisfactory term than either.

Key to Subfamilies and Higher Groups.

I.—Female with an ovipositor formed of two pairs of gonapophyses arising from segments 8 and 9 of abdomen; terminal abdominal segment seldom tubular, that of female longitudinally divided beneath and usually conical, that of male usually bluntly rounded, never tubular. Wings microscopically pubescent; fore wing with marginal vein and at least one longitudinal vein attaining tip.

Suborder Terebrantia Haliday, 1836.
(=Suborder *Thripoidea* Karny, 1907.)

A.—Ovipositor curved upward. Wings broad and rounded at tip. Body not depressed. Antennæ nine-segmented.

Superfamily Æolothripoidea nov.
(=Tribe *Æolothripides* Bagnall, 1914.)

* I have been unable to locate the places of publication of these names.

a.—One family of world-wide distribution, comprising 3 genera and 6 species of fossil forms;* in addition to the recent ones.

Family ÆOLOTHRIPIDÆ Uzel, 1895.

(=Family *Coleoptrata* Haliday, 1836.)

(=Family *Coleoptratidæ* Beach, 1896.)

b.—Labial palpi with fewer segments than the maxillary palpi; antennal segments often freely movable.

c.—Maxillary palpi 7 or 8 segmented; labial palpi 3–5 segmented. (4 monotypic recent genera, from North America and Australia†) . . . Subfamily OROTHRIPINÆ Bagnall, 1913.

cc.—Maxillary palpi 3 segmented; labial palpi 2 segmented. (2 genera, with 6 recent and 1 fossil species, recorded from Europe, Africa, and North America.)

Subfamily MELANOTHRIPINÆ Bagnall, 1913.

bb.—Labial palpi 4 segmented; maxillary palpi 3 segmented; distal segments of antennæ always closely united. (4 genera and 18 species, all recent, recorded from Europe, Africa, and North, Middle, and South America.)

Subfamily ÆOLOTHRIPINÆ Bagnall, 1913.

AA.—Ovipositor curved downward. Wings narrower, almost always pointed at tip. Body more or less depressed. Antennæ 6 to 8 segmented (except in Heterothripidæ). . . Superfamily THRIPOIDEA nov.

(=Tribe *Thripides* Bagnall, 1914.)

b.—Antennæ 9 segmented, without apical stylus; segments 3 and 4 enlarged, conical, without sense cones but with sensory band at apex. Fore tarsus with claw-like appendage at base of second segment. (One genus with 6 recent species, known from North and South America and the West Indies.)

Family HETEROTHRIPIDÆ Bagnall, 1912.

bb.—Antennæ six- to eight-segmented, usually with an apical stylus of one or two segments; segments 3 and 4 not conical, usually with sense cones, rarely with a sensory band at apex. Fore tarsus never with an appendage at base of second segment.

c.—Antennæ not moniliform, six- to eight-segmented, always with an apical stylus of one or two segments; segment 3 usually, and 4 always, with sense cones, never with a tympanum-like sense area on dorsum of apex. Pronotum without longitudinal dorsal sutures; anterior and posterior femora not enlarged. Abdomen usually sharply conical at tip; ovipositor almost invariably well developed.

d.—Sixth antennal segment large, never minute in comparison with fifth, generally the largest in entire antenna.

* It has been impossible to assign all of these fossil species to the subfamilies indicated below.

† The *Orothrips australis* Bagnall (Ann. Mag. Nat. Hist., 8th Ser., Vol. 13, p. 287; March, 1914) is not congeneric with the North American *Orothrips kelloggii* Moulton, the type of the genus, and for its reception the new name **Desmothrips** is hereby proposed. From *Orothrips* this new genus may readily be separated by the closely united fifth to ninth antennal segments, the single sense areas on segments 3 and 4, and the much narrower body and wings.

e.—Last segment of abdomen of female conical, not heavily chitinized, seldom stronger than the preceding segments, bristles on segments 9 and 10 not exceedingly long nor stout, never thorn-like. (One of the largest families of the order, containing about 54 genera and 312 recent species, found in all parts of the world; 11 fossil species.)

Family THRIPIDÆ Uzel, 1895.

(=Family *Stenelytra* Haliday, 1836.)

(=*Stenoptera* Burmeister, 1838.)

(=Family *Stenopteridæ* Beach, 1896).

ee.—Last segment of abdomen of female cylindrical, very heavily chitinized, bristles on segments 9 and 10 exceptionally long and stout, thorn-like. (3 monotypic recent genera, from India, Porto Rico and Africa.)

Family PANCHÆTOTHRIPIDÆ Bagnall, 1912.

(=Subfamily *Panchætothripinæ* Bagnall, 1912.)

dd.—Sixth segment of antenna small, styliform, minute in comparison with the fifth, which is the largest in entire antenna. (One genus of doubtful standing, comprising two recent European species, each of which is known from a single specimen.) . Family CERATOTHRIPIDÆ Bagnall, 1912.

cc.—Antennæ moniliform, eight-segmented, without apical stylus; segments 3 and 4 without sense cones, each with a tympanum-like sense area on dorsum of apex. Pronotum with longitudinal dorsal sutures; anterior and posterior femora greatly enlarged. Abdomen blunt; ovipositor very weak, probably functionless. (One recent monotypic genus, known only from the United States.)

Family MEROTHRIPIDÆ Hood, 1914.

II.—Female without ovipositor; terminal abdominal segment of both sexes always continuous beneath, almost invariably tubular. Wings without pubescence; fore wing with at most a single, abbreviated, median vein . . . . . Suborder TUBULIFERA Haliday, 1836.

(=Suborder *Phlœothripoidea* Karny, 1907.)

f.—Maxillary palpi two-segmented. Antennæ seven or eight-segmented. Middle coxæ more widely separated than front or hind pairs. Ninth abdominal segment not or rarely longer than 8; terminal abdominal hairs rarely much longer than tube.

Superfamily PHLŒOTHRIPOIDEA nov.

g.—Head not produced in front beyond eyes; vertex not sharply conical, rarely prominently overhanging base of antennæ.

h.—Male without a tube-like projection on each side of segment 6 of abdomen.

i.—Last abdominal segment not greatly elongate, never three or four times as long as head nor nearly equal in length to abdomen.

j.—Last abdominal segment tubular in form, sides slightly converging to apex; tergum of abdominal segments 2–9 not transversely linear, 9 usually but little wider than long. (About 75 genera and 368 species, of which one is fossil, represented in all parts of the world.) . . Family PHLŒOTHRIPIDÆ Uzel, 1895.
(=Family *Tubuliferidæ* Beach, 1896.)
(=Family *Ecacanthothripidæ* Bagnall, 1912, pars.)

jj.—Last abdominal segment not at all tubular in form, greatly swollen, parabolic in dorsal aspect; tergum of abdominal segments 2–9 transversely linear, in the only known genus fully five times as wide as median length. (One recent genus and species of unknown habits, from Australia.)
Family PYGOTHRIPIDÆ Hood, 1915.

ii.—Last abdominal segment (the tube) greatly elongate, three or four times as long as head and nearly or quite equal in length to the remainder of abdomen. (3 genera, with 4 (possibly 5) recent Ethiopian and Oriental species.)
Family HYSTRICOTHRIPIDÆ Karny, 1913.

hh.—Male with a stout, tube-like projection on each side of segment 6 of abdomen. (5 genera, embracing 12 recent species of large size, now known from almost all parts of the world.)
Family MEGATHRIPIDÆ Karny, 1913.

gg.—Head more or less produced in front beyond eyes; vertex conical, usually prominently overhanging base of antennæ, bearing the anterior ocellus at its extremity, and usually with a strong bristle in front of eye. (11 genera and 55 species, all recent; the giants of the order, represented in all regions except the Palæarctic.)
Family IDOLOTHRIPIDÆ Bagnall, 1908.

ff.—Maxillary palpi one-segmented. Antennæ four- to seven-segmented. Hind coxæ more widely separated than front or middle pairs. Ninth abdominal segment longer than 8; terminal abdominal hairs very much longer than tube . . . Superfamily UROTHRIPOIDEA nov.
(=Suborder *Polystigmata* Bagnall, 1912.)

k.—One family, from Africa and southern Europe, comprising 4 genera and 5 species, all recent.
Family UROTHRIPIDÆ Bagnall, 1909.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE VARIATIONS OF A BROOD OF WATERSNAKES.

BY E. R. DUNN.

On June 22, 1914, I caught a female *Natrix sipedon*, in James River near Midway Mills, Nelson County, Virginia, about 40 miles below Lynchburg. The river all along here is swift and shallow. There are many low islands covered with heavy grass, where the snakes hide. The most common fish is the spotted catfish, *Ictalurus punctatus*, which has been introduced from the West, and these form the chief food of the snakes.

I kept the female in company with several others of her own species. She showed a larger appetite than any of the others, eating toads, frogs, tadpoles, and small fish, whenever any were offered to her. She shed her skin on July 10, and again on August 19. The other females with which she was confined gave birth to young as follows: two on August 19, and one on each of these dates, August 21, 24, 26, and September 3. This particular specimen, however, did not give birth till October 12.

I observed the birth of most of her brood. The mother crawled around the cage with her tail raised and every now and then she expelled from one to three eggs. The covering of these was transparent and the young could plainly be seen. They lay still for a few moments, then struggled to break the sac and thrust out the head. After accomplishing this, they lay quiet another minute, thrusting out the tongue, and then crawled off, at once becoming very lively. As soon as they dried off, they began to shed the skin. I could observe no egg-tooth in these young snakes.

Originally there were 37 live young, two nearly developed embryos, and one which did not succeed in bursting the egg sac, and so died. Seven, however, were eaten by a large bull-

frog, and one of the embryos was not sufficiently developed for the scutellation to be recorded, so that the number of specimens on which this study is based is 32 young and the mother. The total lengths of 22 killed on November 13 ranged between 167–200 mm.

Variable Characters.

The 32 young and the mother varied in the following characters: number of supralabials, infralabials, nasals, loreals, preoculars, plates in the second row of temporals, dorsal scale rows, ventral plates, subcaudal plates and unbroken color bands around the body.

Invariable are: the number of postoculars (3), the single plate in the first row of temporals, the divided anal, and the divided condition of the subcaudal plates.

Supralabials.—Nine or eight present. The change is caused by the splitting of the third plate counting from the front in specimens with eight. The mother had 9–8.

The young:	Formula.	No. of spec.	Per cent.
	9–8	3	9
	8–8	29	91

Nine 1 2 3 4 5 Eye 6 7 8 9

Eight 1 2 4 5 Eye 6 7 8 9

Infralabials.—Twelve to nine present. The change is caused by the splitting of the last or the fourth and after these two the penultimate divides giving twelve.

Twelve 1 2 3 4 5 6 Eye 7 8 9 10 11 12

Eleven 1 2 3 4 5 6 Eye 7 8 9 11 12

Nine 1 2 3 5 6 Eye 7 8 9 12

The mother had 12–11.

The young:	Formula.	No. of spec.	Per cent.
	11–11	1	3.1
	11–10	5	15.6
	10–10	16	50.0
	10– 9	6	18.7
	9– 9	4	12.5

Nasals.—Where there were three present there was a small upper posterior nasal. Mother, 2–2.

The young:	Formula.	No. of spec.	Per cent.
	2–2	26	81.4
	2–3	3	9.3
	3–3	3	9.3

Loreals or Prefrontals.—Where two loreals were present the prefrontal was divided at the canthus rostralis. Mother, 2–2.

Young: Formula.	No. of spec.	Per cent.
2–2	10	31.2
2–1	2	6.2
1–1	20	62.5

Preoculars.—Where two were present the lower quarter of the normal plate was divided off. Mother, 1–1.

Young: Formula.	No. of Spec.	Per cent.
1–1	18	56.5
1–2	5	15.5
2–2	9	28

Second Row of Temporals.—Mother, 3–3.

Young: Formula.	No. of Spec.	Per cent.
4–3	2	6.2
3–3	25	77.5
3–2	3	9.3
2–2	2	6.2

Unbroken Color Bands.—These were the number of unbroken saddles around the body, which in this subspecies break up into three series of alternating spots on the posterior part of the body. The mother had eleven bands. The young ranged from 17–6. Mean 11.5. Average 10.5.

No. of bands:	17	16	15	14	12	11	10	9	8	7	6
No. of young:	1	1	2	1	2	8	6	5	5	1	1

Sub-caudal Plates.—The mother had 67 pairs. The young ranged from 61 to 80 pairs. Mean, 70.5; average, 66.5.

	Probably Females.							Probably Males.						
Sub-caudals	61	63	64	65	66	67	68	71	73	74	76	77	78	80
No. of young	1	4	3	4	3	4	2	1	1	1	2	2	1	2

Ventral Plates.—The mother had 134. The range of the young was from 130–140. Mean, 135; average, 136.5.

Ventrals	130	131	132	133	134	135	136	137	138	139	140
No. of Young	1	0	1	2	3	4	4	5	3	7	2

The first ventral was taken as the first undivided plate under the throat. I do not believe that a variation of more than 2 at the outside was thus admitted, whereas any other method would have been open to uncertainty, especially as the ventrals are the same color as the throat, and are unspotted till about the 25th.

Position of the Navel.—A point of interest in the consideration of the variation of the ventral series is the position of the navel. This ranges from the 116th to the 128th ventral. The distance between the navel

and the anus varies from 17–13 plates. Thus the distance between the navel and the first ventral varies 12 plates and between the navel and the anus varies 5 plates. The range of variation of the ventrals is 11 plates. These figures seem to indicate that whatever variation takes place in the ventral series, takes place anterior to the navel, which itself varies about 4 plates.

No. of ventrals between navel and anus	17	16	15	14	13
No. of spec.	2	7	9	8	4

Position of navel	116	117	118	119	120	121	122	123	124	125	127
No. of spec.	1	2	1	4	3	2	5	2	7	2	1

Dorsal Scale Rows.—The extremes of variation in this character shown by this series of specimens is 23–25–23–21–19 and 21–23–21–19–17.

The normal method of row dropping for this species seems to be 25—VI, 23—V, 21—VII, 19—IV. The variation in this character can be shown better in the following tables. One point, however, may be made now. In the mother the 19 rows are reduced by dropping the third row. Most of the young also drop the third row in reducing from 19–17, but this is not the usual method with others of this species, or with other species of this genus, a good many of which have been examined.

The 23 count is usually reduced just posterior to the gall bladder.

The Arabic numerals are used to indicate abnormal row-dropping, and show actual row dropped in count from belly at point dropped.

I. 23–25–23–21–19 (+VI—VI—V—VII)

Caudals	23+VI		25—VI		23—V		21—VII		19	Row dropped
	Rt.	Left			—4		—4			
64	26	33	54	59	82	89	114	113	Cont.	Ventral level

Intermediate. 23–25–23–21–19–18–19 (+VI—VI—V—VII—IV+IV)

(The mother)

C	23+VI		25—VI		23—V		21—VII		19—IV	18+IV	19
			—5				—4	—4	—3	+3	
67	37	39	60	70	87	86	101	108	—126	—128	Cont.

Intermediate. 23–25–23–21–19–17–18 (+VI—VI—V—VII—IV+IV)

C	23+VI		25—VI		23—V		21—VII		19—IV		17+IV	18
	+5	+5	—5		—4		—4		—5			
67	44	44	68	66	92	89	115	115	131	128	—130	Cont.

II. 23–25–23–21–19–17 (+VI—VI—V—VII—IV)

C	23+VI		25—VI		23—V		21—VII		19—IV		17
			—5				—4		—5		
68	36	52	41	58	84	85	106	102	132	133	Cont.

Intermediate. 22-23-25-23-21-19-17 (+V+VI—VI—V—VII—IV)

C	22+V	23+VI	25—VI	23—V	21—VII	19—IV	17
		+5					
67	— 19	42 46	53 55	80 85	111 109	133 130	Cont.
		+5	—5 —5	—4	—4	—3 —3	
66	— 16	42 39	42 41	79 80	104 105	128 126	Cont.

Intermediate. 23-24-23-21-19-17 (+VI—VI—V—VII—IV)

C	23+VI	24—VI	23—V	21—VII	19—IV	17 Cont.
		— 5	—4	—4	—3 —3	
65	— 42	— 48	79 78	90 100	124 117	"
			—4		—3 —3	
65	— 40	— 41	75 79	96 96	117 114	"
			—4	—4	—3 —3	
64	— 34	— 35	78 75	94 94	117 117	"
					—3 —3	
40+	— 51	— 53	82 81	101 104	127 120	"

Intermediate. 22-23-24-23-21-19-17 (+V+VI—VI—V—VII—IV)

C	22+V	23+VI	24—VI	23—V	21—VII	19—IV	17 Cont.
		+5	—5	—4	—4 —4	—3 —3	
80	24—	—57	—59	83 84	99 104	131 128	

Intermediate. 21-23-24-23-21-19-17 (+V+VI—VI—V—VII—IV)

C	21+V	23+VI	24—VI	23—V	21—VII	19—IV	17 Cont.
		+5			—4	—3 —3	
67	15 18	—43	—48	84 80	101 106	126 124	
						—3 —3	
66	15 16	—55	—55	75 77	96 99	123 120	
					—4	—3 —3	
63	18 19	—43	—48	76 76	94 93	124 119	

III. 23-21-19-17 (—V,—VII,—IV)

C	23—V	21—VII	19—IV	17 Cont.
			—3 —3	
78	83 84	99 99	130 125	
	—4			
74	80 80	100 98	122 122	
	—4		—3	
65	80 81	97 104	127 128	
64	84 82	100 103	126 128	
	—4		—3 —3	
63	80 85	101 102	132 131	

Intermediate. 22-23-21-19-17 (+V—V—VII—IV)

C	22+V	23—V	21—VII	19—IV	17 Cont.
		—4		—3	
71	—20	76 77	99 97	122 120	
		—4	—4	—3	
63	—20	80 78	100 103	126 122	

IV. 21-23-21-19-17 (+V—V—VII—IV)

C	21+V	23—V	21—VII	19—IV	17 Cont.
	+4	—4	—4		
80	18 20	77 79	91 99	127 124	
			—4	—3 —3	
77	14 13	81 79	96 98	128 124	
		—4 —4		—3 —3	
77	?	83 83	98 99	130 128	
	+4	—4	—4		
76	17 20	80 83	99 99	130 128	
	+6			—3 —3	
76	16 22	78 79	91 96	125 123	
				—3	
73	21 22	77 80	94 102	126 128	
		—4	—4	—3	
68	20 18	79 82	101 103	129 129	
				—3	
67	19 17	72 74	94 97	121 118	
			—4	—3 —3	
66	12 14	79 77	99 104	125 123	
				—3	
65	24 24	77 76	96 97	122 121	
				—3 —3	
63	18 18	83 81	99 100	126 124	
			—4	—3	
61	26 21	70 75	88 90	123 115	

It is perhaps worthy of note that the left side seems to be somewhat higher in number of scale rows than the right. This is especially noticeable in bilaterally assymetrical specimens. Possibly this may be correlated with the assymetry of the lungs, the left being usually the only functional one. A summary of the variations in dorsal scale rows follows:

	No. Rows	♀	♂	%
I.	23-25-23-21-19	1	—	3
II.	23-25-23-21-19-17	1	—	3
(IIa.	21-23-25-23-21-19-17)	none	none	none
III.	23-21-19-17	3	2	15.5
IV.	21-23-21-19-17	6	6	37.5
	Intermediate (bilaterally assymetrical)	10	2	40.6
	" between I and II (mother)	1	—	—
	" " II and IIa	2	—	6
	" " IIa and IV	3	—	9
	" " II and III	4	—	12
	" " II and IV	—	1	3
	" " III and IV	1	1	6

SUMMARY OF VARIATIONS (— indicates normal).

C	V	Scale Rows	Preoc.	2d Row Temp.	Supra Labials	Infra Labials	Loreal	Nasal	Bands	Navel
64	135	23–25–23–21–19	—	—	—	9	—	—	8	119
*67	134	23–25–23–21–19–18–19	—	—	9–8	12–11	2	—	11	
67	138	23–25–23–21–19–17–18	—	—	—	—	—	—	9	124
68	137	23–25–23–21–19–17	—	—	—	—	—	—	8	
67	138	"	2–1	2–3	—	—	—	—	10	122–123
66	140	"	1–2	—	—	—	—	—	11	125
65	133	23–24–23–21–19–17	2	—	9–8	10–9	—	—	10	117
65	130	"	—	—	—	—	—	—	11	116–117
64	132	"	—	—	—	—	—	—	10	118
40+	134	"	—	—	—	10–11	—	—	11	120–121
80	139	22–23–24–23–21–19–17	1–2	3–4	—	10–9	—	—	6	125–126
67	139	21–23–24–23–21–19–17	—	—	—	9	—	—	9	122
66	135	"	—	—	—	—	—	—	9	121–122
63	136	"	—	2–3	—	11–10	—	—	11	119–120
78	137	23–21–19–17	—	—	—	—	2	—	17	124–125
74	133	"	2	—	—	9–10	2	3–2	11	117–118
65	137	"	—	—	—	—	—	—	11	
64	139	"	—	—	—	11–10	—	—	9	124
63	139	"	2	—	—	—	2	3	9	123
71	135	22–23–21–19–17	2	2	9–8	9	2–1	—	14	122–123
63	136	"	—	—	—	11–10	—	—	8	120
80	139	21–23–21–19–17	—	3–4	—	9	—	—	7	124
77	139	"	2–1	—	—	—	2	—	11	124
77	136	"	2	—	—	10–9	2	3	12	123–124
76	140	"	2	—	—	9–10	2	3	15	127–128
76	137	"	—	2–3	—	10–11	2	—	11	122–123
73	138	"	—	—	—	10–9	2	—	12	124
68	136	"	—	—	8–9	11	2–1	—	8	121–122
67	134	"	1–2	—	—	—	—	—	10	120
66	139	"	—	—	—	—	—	—	10	124
65	135	"	2	2	—	—	2	3–2	16	119
63	134	"	2	—	—	—	—	3–2	10	119
61	137	"	2	—	—	—	2	—	8	122
		Normal seems to be	1	3	8	10	1	2		

* Mother.

Correlations.—The most obvious correlation appears to be the phenomenon of a high number of subcaudals (i. e., the male sex) and a low scale formula.

A double loreal appears to accompany a low scale formula also, and a triple nasal very rarely appears in the absence of the double loreal. No other correlations are evident.

Conclusions.—These are chiefly conspicuous by their absence, but the young appear to inherit from the mother: (*a*) the decided abnormality of a double loreal; (*b*) the reducing of 19 to 17 by dropping the third row. The averages of ventrals, sub-caudals, and color bands are quite close to the mother's formula. They show a smaller number of dorsal scale rows, and a smaller labial formula.

Vol. XXVIII, pp. 69–70 March 12, 1915

PROCEEDINGS

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GENERAL NOTES.

DETERMINATION OF VESPERUGO VAGANS DOBSON FROM "BERMUDA."

In 1879, shortly after the publication of his classical Catalogue of Chiroptera, Dr. G. E. Dobson described a bat, said to be from Bermuda, as *Vesperugo vagans*,* its type being in the British Museum (No. 79. 1. 7. 1.). This bat has never been rediscovered, nor is it even mentioned in the account of the Mammals of Bermuda,† written by the donor of the specimen, Mr. J. M. Jones.

I have now examined the type, and extracted its skull, which although broken, shows most of the essential characters.

After a vain attempt to fit it to any known American, European, or African bat I have at last been able to identify it with one from New Zealand, *Chalinolobus tuberculatus* Gray, with which it agrees in every detail. How the mistake as to its locality occurred, it is impossible to say, and of but little importance. What matters is we may now safely bury the hitherto problematical *Vesperugo vagans* Dobson, 1879, in the synonymy of *Chalinolobus tuberculatus* Gray, 1843, and so dispose of the fiction that Bermuda contains a special bat of its own. —*Oldfield Thomas.*

THE GENERIC NAME CONNOCHÆTES OF LICHTENSTEIN.

In the General Notes for 1914 (p. 228) Doctor Lyon shows reason for the rejection of the names *Gazella* and *Bubalis* as dating from Lichtenstein, 1814, on the ground of their having been published as plural words ("*Gazellæ*" and "*Bubalides*"), and he attempts to do the same for *Connochætes*. But in this I venture to think he is in error, for while 8 species are included in the *Bubalides* and 12 in *Gazellæ*, not to mention the 8 in "*Antilopæ genuinæ*," only one is included in *Connochætes*, so that this word, as formed by its author, would not have been a plural word at all, but a singular one, and as such valid in nomenclature.

Moreover, apart from any question of construction, the derivation of the word is amply indicated by Lichtenstein's own quotation of "*Bos connochætes* Forster in Mscpt. p. 66" among the synonyms of the single species included.

Connochætes therefore appears to me to be a perfectly valid generic name. —*Oldfield Thomas.*

* Ann. Mag. N. H. (5) IV, p. 135. 1879.

† Bull. U. S. Nat. Mus. No. 25, p. 145. 1884.

THE TYPE LOCALITY OF PECARI TAJACU.

The Linnæan name *Sus tajacu* * has been applied by recent mammalogists, almost without exception, to the South American collared peccary. There is now no misunderstanding as to its use in this group rather than to one of the larger white-lipped peccaries (*Tayassu*). Recently, however, Thomas has proposed,† by use of a consistent method for determining bases of all Linnæan mammal names of 1758, to fix the type locality of *Sus tajacu* in Mexico. Practical and convenient as it is in most cases, this method is faulty in the case of the peccary, as the name has already been definitely fixed on a South American species by earlier workers.

Linnæus gave the range of his *Sus tajacu* as "Mexico, Panama, Brazil." Cope,‡ in reporting on a collection of mammals from Brazil, separated the peccary of Texas as a new species, thus virtually, as "first reviser," restricting the Linnæan *tajacu* to Brazil. Mearns,§ Bangs,‖ and Merriam,¶ the next writers to describe new forms, did so with the belief that Cope's action was settled and definite. Bangs even remarked that "when Prof. Cope named the Texan peccary *angulatus* he irrevocably restricted the Linnæan name *tajacu* to the peccary of southern Brazil." In this particular case the selection of Mexico as the type locality is open to further question because the final basis for this fixation, "Tyson's description of what he calls a Mexican Musk-Hog," refers as much to South America as to Mexico. Tyson,** in describing the anatomy of the animal which came under his observation, gives no clew as to the origin of the specimen and simply uses the name "*Aper Mexicanus Moschiferus* or Mexico Musk Hog" as we would say Carolina wren, English sparrow, or Chinese pheasant, regardless of where the specimen was captured. So far as can be ascertained from a reading of Tyson's account, his specimen may well have come from some South American port.

Before this proposed change of names goes further, it seems important to consider all these facts. Except from evidence that might be furnished by the discovery of a type specimen, it seems to me that it is not possible to change the type locality of *Pecari tajacu* to Mexico, as an actual first reviser has already fixed it in Brazil. —*N. Hollister.*

A NEW NAME FOR THE WHITE-TAILED JACK RABBIT.

The name in use for the white-tailed jack rabbit of the Great Plains, *Lepus campestris* Bachman (Journ. Acad. Nat. Sci. Philadelphia, vol. 7, p. 349, 1837), is preoccupied by *Lepus cuniculus campestris* Meyer (Mag. f. Thiergesch., vol. 1, p. 55, 1790), a synonym of *Oryctolagus cuniculus*. The *Lepus campestris* of Bachman may be replaced by *Lepus townsendii* **campanius**. The two western subspecies of this jack rabbit will be known as *Lepus townsendii townsendii* Bachman and *Lepus townsendii sierræ* Merriam. —*N. Hollister.*

* Syst. Nat., 10 ed., vol. 1, p. 50. 1758.

† Proc. Zool. Soc. London, 1911, p. 140.

‡ Amer. Nat., vol. 23, p. 147. February, 1889.

§ Proc. U. S. Nat. Mus., vol. 20, p. 469. 1897.

‖ Proc. Biol. Soc. Washington, vol. 12, pp. 164-165. August 10, 1898.

¶ Proc. Biol. Soc. Washington, vol. 14, pp. 102, 119-124. July 19, 1901.

** Phil. Trans., 1683, pp. 359-385.

Vol. XXVIII, pp. 71–78 March 12, 1915

PROCEEDINGS

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RECENT NOTES REGARDING WEST INDIAN REPTILES AND AMPHIBIANS.

BY T. BARBOUR.

Since my preliminary survey of the herpetological fauna of the West Indies * was published, new material has made it possible to clear up the identity of several species the status of which was in doubt, to present new locality records for several species, and to characterize some which appear to have remained undescribed. Since the revision of the genus *Ameiva* is the subject of a special study by Mr. G. K. Noble and myself no notes upon it will appear in this short paper. I also hope to review the Cuban forms in collaboration with Mr. C. T. Ramsden of Guantanamo hence I am reserving recent Cuban data for that paper, now fairly well under way.

During the past summer Mr. G. K. Noble and Mr. F. R. Wulsin made a trip to the West Indies for the Museum of Comparative Zoology, Cambridge, Mass. Mr. Wulsin was able to remain but a short time, while Mr. Noble remained for some ten weeks upon Guadeloupe making full collections of the land vertebrates. These men both got some interesting species upon other islands which they touched at both going and returning. Beside this Dr. A. G. Ruthven of the Zoological Museum of the University of Michigan has kindly allowed me to examine and retain a considerable portion of the material which he obtained during the stays in West Indian harbors of the ship in which he journeyed to and from Demarara. Some of his material has been extremely helpful.

Eleutherodactylus lentus (Cope).

Up to 1914 I had not been able to satisfy myself of the certainty of the occurrence of this species upon St. Croix, and I recorded it as confined

* Mem. M. C. Z., 44, 1914, p. 209–359, pl. 1.

to St. Thomas. (l. c. p. 247.) This summer, however, Noble and Wulsin found it upon St. Thomas, and both Noble and Ruthven found it even more abundant upon St. Croix both at Christiansted and Fredricsted. I am unable to find any difference between the individuals from the two islands.

Leptodactylus albilabris (Gunther).

I was at first inclined to believe that a series of examples collected by Ruthven and Noble at St. Croix were different from those from St. Thomas (the type locality) and Porto Rico. Since, however, I have had the opportunity to examine some specimens which Doctor Stejneger loaned me from both these localities. I am convinced that all are probably the same. These Leptodactyli are curious and puzzling "frogs" and large series should always be gathered when possible, as some peculiar variations occur.

Sphaerodactylus macrolepis Gunther.

This species was described from St. Croix and subsequently recorded from St. Thomas. This summer both Messrs Noble and Wulsin, as well as Doctor Ruthven and his assistant Mr. Gaige, visited both these islands, staying for some days at St. Croix on their return voyage, where Ruthven, Gaige and Noble did extensive collecting together. Nearly a hundred Sphaerodactyli were secured on both these islands. All are referable to one species, which agrees with what Garman has called, without doubt correctly, *Sphaerodactylus macrolepis*. On St. Croix the lizards were secured not only at Christiansted but also at Fredricsted, at the opposite end of the island. Some were secured about houses in the towns, many others in the country. The collection makes it quite evident to me that but a single species of *Sphaerodactylus* is found in St. Croix as is usual on all but the Greater Antilles. In 1862 Reinhardt and Lutken described *S. microlepis* on a specimen said to have come from St. Croix, but the describers stated clearly that the locality record needed confirmation. Beside this they identified their new form with A. Dumeril's *S. fantasticus varieté à taches noires*, which came from St. Lucia. The diagnosis of *S. microlepis* certainly recalls a Lesser Antillean form, and the type probably never came from St. Croix. I suggest then that the name probably belongs to the St. Lucia species, in which case *S. melanospilus* Bocourt, also from St. Lucia, becomes a synonym of *microlepis*, which is probably confined to that island.

Sphaerodactylus fantasticus Duméril & Bibron.

It becomes increasingly evident that the species of this genus do not range widely through the Antillean chain. Anderson (Bih. K. Svensk. vet.-akad. Handl., 1900, 26, afd. 4, No. 1, p. 27) has examined Sparrman's type of *S. sputator* which came from St. Eustatius and said that it was the same as *S. fantasticus* of Duméril et Bibron, which was said to have come from Martinique. There is no evidence that Anderson made a direct comparison hence it is wise until we know to the contrary

to assume that *S. sputator* is confined to St. Eustatius. *S. fantasticus* was one of the species received from Plée and credited by Duméril et Bibron to Martinique. Stejneger pointed out how worthless was this information.* Further investigation shows that while Plée evidently collected at the various French Islands, probably on a voyage from Porto Rico to Martinique, he did very little reptile collecting upon that island itself.

This summer Doctor Ruthven got three Sphaerodactyli upon Martinique and it became obvious at once that they were not *fantasticus*, since they lacked the granular middorsal area mentioned by Duméril et Bibron. When on the other hand, I examined Noble's series of about fifty examples from Guadeloupe I was struck by their very exact agreement with the description of *fantasticus*. This was especially evident in comparing specimens with Duméril et Bibron's figure, since I was able to match absolutely with several different individuals the peculiar and I imagine quite characteristic markings of the head and neck region. Thus I submit that *S. fantasticus* D. & B. was really collected by Plée upon Guadeloupe, not Martinique, and is, so far as we now know certainly, confined to the Island of Guadeloupe. The Martinique species which appear to be undescribed may be known as

Sphaerodactylus festus sp. nov.

Type, an adult, M. C. Z. No. 10622, collected on Martinique, French West Indies, July 4, 1914, by Dr. A. G. Ruthven. Paratypes in the M. C. Z. and the University of Michigan, Zoological Museum.

Snout rather pointed but short, the distance from the tip to the eye being slightly less than that from the posterior border of the eye to the ear opening, not quite twice the diameter of the eye; rostral rather large with a long median cleft behind; nostril between rostral, first supralabial, a single rather large postnasal and a larger supra-nasal which is separated from its fellow of the other side by a single small scale, these three bordering the rostral above; three large supralabials to the center of the eye; a prominent spine on the superciliary margin over the middle of the eye; head above and on the sides covered with small rounded granular or tubercular scales; those on back small, keeled, very slightly imbricate, eighteen to twenty equivalent to the distance from tip of snout to ear opening; mental large, longer than rostral; one very large, one medium sized and one small infralabial to below the center of the eye; two small chin shields behind mental followed by a series of five flat smaller scales, scales of throat and lower neck uniform in size, flat and polygonal; on chest and belly larger, flat and slightly imbricate. Scales of limbs small, elongate, imbricate and keeled; of tail above whorls of small pointed imbricate slightly keeled or flat scales, below with a median series of large hexagonal plates with several lateral series of smaller flat scales.

Color.—Almost uniform brown above with very faintly indicated chevron shaped lighter markings on hind neck and sacral regions.

* Herpetology of Porto Rico, Washington, 1904, p. 622–623.

This species is evidently one of the medium sized forms, being considerably larger than *S. torrei* from Cuba, of course far larger than *S. elegans*, and not reaching to anything like the size of *S. picturatus* from Haiti, *S. asper* from Andros or *S. richardsonii* from Jamaica which are the largest species in the genus. In no one of the three examples before me is the tail perfect, but the length of the largest specimen (Paratype in U. of Mich. Mus.) from snout to vent is 30 mm. The type is not quite so large, but all the specimens are evidently adult.

I have given this species the specific name of *festus* because the types were caught on Independence Day, July 4, 1914.

The larger Anolis from the Island of Antigua has been referred by Boulenger to *Anolis leachii*.* This species was described in rather general terms by Duméril et Bibron from the Antilles, the types having no definite locality. When I published my West Indian Herpetology in 1914, I located *A. leachii* on Guadeloupe, partly because it was very probable that the Paris Museum would receive material from this formerly flourishing French Colony and partly because Boulenger has declared *Anolis ferreus* Cope to be a synonym of *leachii*.† The type of *A. ferreus* in the British Museum was said to have come from Guadeloupe. I had no Guadeloupe specimens until Mr. Noble returned with a large series, fresh and carefully preserved. They agree well with Cope's description of *A. ferreus*, having weakly but distinctly keeled ventral scales, while Duméril et Bibron state definitely "*Squames ventrales lisses, entuilées.*" So that it becomes evident that until the types of *leachii*, if they are still to be found and are in usable condition, can be studied and compared with fresh material with full data, the name will have to drop temporarily from use. The Guadeloupe individuals may be called *Anolis ferreus* (Cope), while those from Antigua which are very different may be known as *Anolis antiquae* sp. nov. The specimens from Nevis in the British Museum will probably be found to be the same as these in this Museum which Garman has called *A. bimaculatus*. Having no topotypes from St. Eustatius this allocation can not be considered of much authority. At present the old name *Anolis bimaculatus* Sparrman must be retained for topotypes from St. Eustatius, and perhaps for the Anoles from Nevis and St. Kitts, it can not be considered the same as *A. leachii* on the evidence given by Anderson.‡ Although it would be almost too good to be true to see the name *leachii*, a veritable vagrant among names, buried in the synonymy of *bimaculatus*.

Anolis antiquae sp. nov.

Type an adult male, M. C. Z. No. 10624, from near St. John, Antigua, B. W. I., collected by G. K. Noble and F. R. Wulsin.

Top of head with two diverging frontal ridges, which enclose a rather broad shallow frontal hollow; head scales nearly flat, except those of the

* Ann. Mag. N. H. 1894, ser. 6, 14, p. 375.

† Cat. Liz. B. Ill., 2, 1385, p. 29.

‡ Bih. Svensk. vet.-akad. Handl., 1900, 26, 4, 1, p. 27.

canthal and frontal ridges; rostral low, narrower than the mentals; eight or nine scales in a series between the nostrils; supraocular semicircles partly in contact and partly separated by one or two minute scales; occipital rather larger than ear opening, separated from the supraocular semicircles by two or three extremely irregular series of polygonal flat scales some of which are larger and some about equal in size to the dorsal granules; supraorbital disc composed of eight or nine enlarged flat polygonal and very slightly tubercular scales surrounded by several rows of granules; one large and two very small scales between the superciliaries and the supraocular semicircle bordering the supraocular granules anteriorly; canthus rostralis sharp, consisting of five elongate shields; supraciliary ridge consisting of one very long and narrow anterior shield followed by a double series of smaller scales which separates the supraocular granules from those covering the lateral orbital region; loreal rows five, the lower row with raised lower edges, many of the others slightly rugose and often separated from one another (especially the posterior loreals) by minute granules; three posterior scales only, of subocular semicircle, keeled; all scales of this semicircle except the anterior one in contact with the supralabials; nine or ten supralabials, the suture between the seventh and eighth being under the center of the eye; temporals small, flat and rounded, with two distinct enlarged supratemporal series; dorsals rather coarsely granular, strongly keeled, a well defined median double series of larger ones; ventrals, rather large, imbricate, rounded behind, perfectly smooth, those of the throat smaller, more elongate, a few on the gular pouch very slightly keeled; fore limbs above with sharply keeled scales, those on the upper arm slightly smaller, those on the lower arm about equal in size to the ventrals; anterior face of femur and underside of tibia quite similarly covered, the scales on the former gradually decreasing on the underside, the upper side of both being covered with scales slightly larger than the dorsals; scales on fingers and toes sharply carinate; digital expansion very wide, about 27 lamellae under phalanges ii and iii of fourth toe; tail moderate in length, strongly compressed; the caudal verticels distinctly indicated by vertical series of more enlarged scales, those between being slightly smaller and more pointed in about six vertical series, irregular and all strongly imbricate and heavily keeled; the scales along the upper edge of the tail raised and spinous, forming a serrated ridge enlarged teeth of which correspond to the posterior end of each verticel, three spines, two small and one large correspond to each verticel; dewlap small, the anterior edge thickened; a series of four enlarged flat postanal scales.

Color in spirits uniform brown above, thickly dotted and vermiculated with darker; all lower surfaces smoky. Color of dewlap in life unrecorded but apparently smoky like the other ventral surfaces.

This lizard is a heavy, rather clumsily built *Anolis*, with a rather broad blunt snout and swollen jowls. The tail is but slightly longer than head and body. The fingers and toes are long and sprawling and the digital expansions very noteworthy. A single young specimen which Mr. Noble also preserved shows the characters of the adult and is marked in just

the same way. Many details of the cephalic squamation of *antiquae* recall those of *A. cristatellus*, but the tail, of course, is very different there being no "fin" in this species while the scales below the eyes and between the nostrils are also very different. It is widely separated from *A. ferreus* Cope from Guadeloupe, with which it has been associated when both were called *A. leachii*.

The method of description which I have used is based on Stejneger's, the only one which is sufficiently detailed unless the species described is compared directly with some widely known, and common valid species. It is my hope at some future time to rediscuss all of the Antillean species of *Anolis* giving figures and full descriptions, but material is still not available from several islands.

Anolis marmoratus Duméril & Bibron.

This was another of the species said to have been collected at Martinique by Plée. Garman, although he collected an enormous series of *Anolis* from Martinique did not find the species there. He decided, however, that the specimens collected by Richardson from Desirade were referable to it. This opinion is, of course, but a guess since the types in Paris have not been examined. It is nevertheless not improbable that *A. marmoratus* is confined to Desirade, as *A. asper* is to Marie Galante, and *A. ferreus* to Guadeloupe. Desirade is a French Island and it seems likely that Plée confined his collecting to these after leaving Porto Rico. It is possible that the vessel on which he journeyed touched at the French Islands only. Garman's course in assigning *A. cepedii* to Martinique was justified since Lacépède distinctly states * that the example upon which his description and remarks are based were sent to Paris from Martinique. Some of the subsequent writers such as Merrem, who in 1820 gave the species the name *cepedii*, simply stated that it came from the Antilles and at different times it has been confused with various other races. The name *cepedii* may be restricted, however, to what is apparently the only species found on Martinique.

Mr. Noble secured four Anoles; three are adults, which seem to differ constantly from their near neighbors on Guadeloupe. They came from Terre d'en Haut, Les Saintes, one of two small islands lying at some distance south of the southwest extremity of Guadeloupe. These lizards are distantly related to the Anoles of Dominica and to those of Marie Galante and Desirade. The species may be known as

Anolis terrae-altae sp. nov.

Type, an adult, M. C. Z. No. 10,627, from Terre d'en Haut, Isles des Saintes, Guadeloupe, Fr. W. I. From the collection of G. K. Noble made during the summer of 1914.

This species is closely related to *Anolis ferreus* of Guadeloupe. It may be distinguished by the perfectly smooth ventrals which in specimens of *ferreus* of the same size show a distinct tendency toward weak keels. The supraorbital semicircles are much more extensively in contact (sometimes

* Hist. Nat. Quad. Ovip. 2, 1788, p. 120.

almost completely so). The scales of the infraorbital semicircles are much less keeled. The profile is slightly flatter, the head slightly narrower, the muzzle more acuminate.

Leptotyphlops bilineata (Schlegel).

Schlegel based this species on examples from Martinique collected by Plée. Duméril et Bibron, a very little later, mentioned specimens in the Paris Museum from Martinique and from Guadeloupe collected by Plée and by Guyon. The Guadeloupe record is probably correct, the Martinique record is valueless until confirmed, although Boulenger states that there is a Martinique specimen in the British Museum. As no other data are given it is not unlikely that this was one of the Plée specimens distributed by the Paris Museum. The British Museum has a specimen from Barbados, given by Colonel Fielden. It is interesting now to record a specimen from St. Lucia collected July 5, 1914, by Dr. A. G. Ruthven and by him given in exchange to the M. C. Z. The species, which is confined to the Lesser Antilles, will probably be found to have a considerable range through the islands.

Typhlops lumbricalis Linne.

Noble heard from all the local observers of the Guadeloupean fauna that this species had become excessively rare if it was not already extirpated. It is well worth recording that the exterminating agent was not in this case the always culpable mongoose alone, but largely the giant toad, *Bufo marinus* (Linne). This creature has been introduced by man in comparatively recent times into almost all of the islands, and is said to snap up greedily every *Typhlops* which it sees. As is well known the blind snakes sometimes crawl about at dusk or after showers as do amphisbaenians and earthworms. With the material so kindly entrusted to me by Doctor Ruthven, I find a single little blind snake from St. Croix. It is a pallid creature quite different in color from any lumbricalis which I have ever caught or seen. I can not, however, find any characters for separation and I am of the opinion that this little snake is albinistic, although the eyes show a trace of pigmentation. Albinism in reptiles is rare but, of course, well known. I remember once a native bringing me a completely albinistic *Amyda*. It was in Java and I could examine the beast but could not kill and preserve it, for such beasts are *Kramat*, and venerated, and this ancient superstition applied even to the extremely ugly white water buffalos.

Herpetodryas carinatus (Linne).

In my West Indian Herpetology (p. 331) I discussed the occurrence of the golden tree snake upon Guadeloupe, whence Boulenger had recorded a specimen in the British Museum. I suggested that the locality might be incorrect. There can now be no doubt that this is the case, since Mr. Noble's careful inquiries made in all parts of the island make it quite certain that no such snake ever occurred there.

Drymobius boddaerti (Sentzen).

Writing previously (l. c. p. 330) I stated that I was unable to find the series of Granadian examples in this Museum from which the individual

recorded by Boulenger in his catalogue was sent to the British Museum. This series has now come to light and contains both young and adult specimens so that I have been enabled to discover that the individuals upon which I based my *Alsophis bruesi* from Granada, represent in truth this variable species. I have also found and examined the dentition of Garman's type of his *Alsophis pulcher* from Testigos Island and am able to verify Boulenger's action in placing it in the synonymy of *Drymobius boddaerti*.

Mr. Noble secured from Terre d'en Haut, Isles des Saintes, a series of twelve Alsophes which seem to represent a local color form. The series is singularly uniform in color and emphasizes the peculiar stability of color among specimens from the same island. Thus every one told him that the *Alsophis* on Guadeloupe (*A. leucomelas* D. & B.) was invariably black, unfortunately it is now probably extinct. All the Guadeloupean examples in the L'Herminier Museum at Point-a-Pitre were black as is one probably from Guadeloupe, collected by Guesde and received by this Museum from the U. S. National Museum. The form on Dominica is very distinct in coloration and I have no doubt but that the variability of color mentioned by some writers was because they had specimens from several islands. We know that Duméril and Bibron had among the types of *A. leucomelas* specimens from both Guadeloupe and Martinique. I can not see any reason why when this coloration is stable it should not be just as good a reason for separating races as it is among birds, for instance.

Alsophis sanctonum sp. nov.

Type an adult, M. C. Z. No. 10,686, from Terre d'en Haut, Isles des Saintes, near Guadeloupe, French West Indies.

Similar in squamation to *A. leucomelas* of Guadeloupe, but light ashy gray instead of dark chocolate brown. Scale formula of type, 19 rows; ventrals 202, subcaudals 118 (tip of tail gone).

The eleven paratypes show that the range in squamation is scale rows 19, ventrals 195–206, subcaudals range doubtful owing to number of tails imperfect but probably from 128 to 139. The only variation in color seen is in that a few examples tend to be light reddish rather than light grayish, and one (M. C. Z. No. 10,688) is a little darker reddish and has a dark vertebral line, which is but very faintly indicated in some of the others. There is in all specimens the dark band through the eye extending to the neck region which is seen in so many of the allied forms.

Doctor Stejneger kindly loaned me for study a considerable collection of reptiles made by L. Guesde and all said to be from Guadeloupe. For his courtesy I extend to him my hearty thanks. I noted, however, species peculiar to Marie Galante, Desirade, Dominica, and probably to three other islands as well as some such as *Thecadactyles rapicaudus* and *Hemidactylus maboiua* which might have come from Guadaloupe—or almost anywhere else. I should like, therefore, to warn students against basing any deduction on Guesde's material which may have been distributed to many museums. Guesde evidently was a worthy follower of Plée, geographically and mentally.

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PROCEEDINGS

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PRELIMINARY DIAGNOSES OF APPARENTLY NEW SOUTH AMERICAN BIRDS.

BY W. E. CLYDE TODD.

It is intended herewith to present brief diagnoses of such birds, believed to be new to science, as have been discovered in the collection of the Carnegie Museum since the publication of the writer's last paper on the subject in these Proceedings (Volume XXVI, 1913, 169–174). Several important collections of South American birds having come to hand in the meantime, the full report on which will necessarily be delayed, it has seemed best to publish the new forms discovered at once, in this preliminary way, leaving their fuller discussion to a future date, the circumstances which obtain appearing to justify such a proceeding. The writer's acknowledgments are due to Mr. Harry C. Oberholser for assistance in making certain comparisons and preparing sundry descriptions.

Brachyspiza capensis hypoleuca subsp. nov.

Differs from *Brachyspiza capensis capensis* (Müller) in its much whiter under parts, with little or no brownish or grayish suffusion on the breast. Decidedly smaller than *B. c. pulacayensis* Menegaux. Wing, 68; tail, 63; bill, 10.

Type, No. 45,868, Collection Carnegie Museum, adult male; Rio Bermejo, Argentina, May 21, 1914; José Steinbach.

Sporophila hypochroma sp. nov.

Nearest to *Sporophila hypoxantha* Cabanis, from which it differs in having the rump and entire under parts rich bay, instead of tawny or cinnamon rufous.

Type, No. 43,922, Collection Carnegie Museum, adult male; Buenavista, Bolivia, January 25, 1912; José Steinbach.

Pheugopedius fasciato-ventris cognatus subsp. nov.

Similar to *Pheugopedius fasciato-ventris albigularis* (Sclater), but upper parts brighter, more rufescent; tail also more rufescent, and more regularly barred; and lower part of auricular region white. Differs from *P. f. fasciato-ventris* (Lafresnaye) in having a band of black (unbarred) adjoining the white area of the throat and upper breast.

Type, No. 43,014, Collection Carnegie Museum, adult male; Fundacion, Santa Marta, Colombia, August 18, 1913; M. A. Carriker, Jr.

Hypolophus pulchellus phainoleucus subsp. nov.

Similar to *Hypolophus pulchellus pulchellus* Cabanis and Heine, but adult male with more white on the pileum, sides of the head, remiges, rectrices, and under parts generally. Female decidedly paler in general coloration.

Type, No. 45,478, Collection Carnegie Museum, adult male; Rio Hacha, Colombia, May 2, 1914; M. A. Carriker, Jr.

Erionotus punctatus subcinereus subsp. nov.

Similar to *Erionotus punctatus punctatus* (Shaw), but bill decidedly larger; adult male with under parts paler gray, more white freckling on the sides of the head, and more black on the back; adult female much more buffy in general coloration than in either *E. p. punctatus* or *E. p. atrinucha*.

Type, No. 44,363, Collection Carnegie Museum, adult male; Don Diego, Santa Marta, Colombia, January 15, 1914; M. A. Carriker, Jr.

Drymophila caudata hellmayri subsp. nov.

Similar to *Drymophila caudata caudata* (Sclater), but with the center of the crown and nape pure black, unstreaked. (In typical *D. ç. caudata* these parts are always prominenly streaked with white, except in worn plumage—*fide* C. E. Hellmayr in litt.)

Type, No. 38,046, Collection Carnegie Museum, adult male; Cincinnati, Santa Marta, Colombia, August 9, 1911; M. A. Carriker, Jr.

Herpsilochmus sticturus nigrescens subsp. nov.

Similar to *Herpsilochmus sticturus sticturus* Salvin, but back with more admixture of black, and under parts much darker, more grayish, the throat and breast indistinctly striped with dusky grayish and white.

Type, No. 33,052, Collection Carnegie Museum, adult male; Maripa, Rio Caura, Venezuela, December 20, 1909; M. A. Carriker, Jr.

Formicarius moniliger virescens subsp. nov.

Similar to *Formicarius moniliger saturatus* Ridgway, but upper parts decidedly olivaceous (instead of brownish), sides of neck brighter cinnamon, and tail averaging longer, with the dark apical portion more restricted. Wing (type), 95; tail, 55; bill, 20; tarsus, 32.

Type, No. 42,714, Collection Carnegie Museum, adult male; Fundacion, Santa Marta, Colombia, August 9, 1913; M. A. Carriker, Jr.

Grallaria varia carmelitæ subsp. nov.

Similar to *Grallaria varia varia*, but smaller, and posterior lower parts darker, more cinnamon rufous. Wing (type), 100; tail, 38; exposed culmen, 21.5; tarsus, 45.

Named, at the collector's request, for Mrs. M. A. Carriker, Jr.

Type, No. 44,850, Collection Carnegie Museum, adult male; Pueblo Viejo, Colombia, March 6, 1914; M. A. Carriker, Jr.

Setopagis heterurus sp. nov.

With a general resemblance to *Setopagis parvulus* (Gould), but under parts less rufescent, and white areas of wings and tail decidedly more extensive, covering both webs of the terminal portion of the three outer pairs of rectrices.

Type, No. 41,904, Collection Carnegie Museum, adult male; La Tigrera, Santa Marta, Colombia, May 6, 1913; M. A. Carriker, Jr.

Pionus sordidus saturatus subsp. nov.

Similar in general to *Pionus sordidus sordidus* (Linnæus), but differing conspicuously in its much darker, greener coloration, both above and below, the feathers of the upper parts without conspicuous paler olive brown or olive grayish edgings, and the under surface much darker and more uniform green, with little or no brownish and vinaceous tinge.

Type, No. 41,705, Collection Carnegie Museum, adult male; Cincinnati, Santa Marta, Colombia, February 12, 1913; M. A. Carriker, Jr.

Psittacula passerina cyanophanes subsp. nov.

Adult male similar in general to the same sex of *Psittacula passerina viridissima* Lafresnaye, but with much more hyacinth blue on the primary and secondary coverts, forming a conspicuous patch in the closed wing, while this color is also much more extended on the under wing-coverts.

Type, No. 45,580, Collection Carnegie Museum, adult male; Rio Hacha, Colombia, May 4, 1914; M. A. Carriker, Jr.

Aratinga æruginosa occidentalis subsp. nov.

Similar to *Aratinga æruginosa æruginosa* (Linnæus), but the blue color of the pileum more pronounced; the frontal region, bordering the base of the upper mandible, dusky brownish, never white; the orbital ring paler, with scarcely any (sometimes no) yellow tinge; and the wings externally more bluish, less greenish.

Type, No. 44,695, Collection Carnegie Museum, adult male; Rio Hacha, Colombia, February 22, 1914; M. A. Carriker, Jr.

Pyrrhura molinæ australis subsp. nov.

Similar to *Pyrrhura molinæ molinæ* (Massena and Souancé), but general coloration decidedly deeper; pileum and nape darker (nearer fuscous than sepia), and sides of the head and neck correspondingly darker; throat and breast darker, less buffy, with the paler feather-edgings narrower; abdomen more extensively red; and under tail-coverts scarcely or not tinged with blue.

Type, No. 45,895, Collection Carnegie Museum, adult (not sexed); Rio Bermejo, Argentina, May 23, 1914; José Steinbach.

Penelope speciosa sp. nov.

Most nearly related to *Penelope jacquâçu* Spix, from which it differs in having the cheek-stripe mainly cinereous (instead of dusky brown), the upper wing-coverts broadly edged with white, and in the feathers of the crest being narrow, acuminate, and broadly edged with pale gray.

Type, No. 38,350, Collection Carnegie Museum, adult (male?); Rio Surutu, Provence del Sara, Bolivia, August 14, 1910; José Steinbach.

Vol. XXVIII, pp. 83–86 April 13, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SPECIES OF PIPUNCULUS.

[DIPTERA; PIPUNCULIDÆ.]

BY FREDERICK KNAB,
Bureau of Entomology.

The species described in the following were reared during investigations conducted by Prof. H. H. Severin from sugar-beet leaf-hoppers parasitised by the larvæ. They are briefly characterized herewith, in order that the names may be used in presenting the results of the investigations.

Pipunculus industrius new species.

Male.—Frons a narrow wedge extending about one-third the way to posterior eye-margin, silvery pollinose; ocellar triangle small and narrow, shining black. Face silvery pollinose, slightly broader than base of frons. Antennæ black, the third joint acuminate, its apex white and drawn out to a sharp point; arista black. Occiput shining black, finely shagreened; the sides silvery pollinose. Mesonotum black; shining and slightly shagreened on the disk, dusted with gray anteriorly, at the sides and in the prescutellar groove; humeral angles pale. Scutellum shining black; postnotum gray pruinose. Pleuræ black dusted with gray. Abdomen narrowed at base, swollen beyond; black dorsally, the posterior half shining and roughened, on the sides dusted with gray; first segment with the posterior half gray pollinose and with two or three stiff black bristles at the sides. Hypopygium large and broad, nearly symmetrical in dorsal view, broader and longer than the fifth segment, broadly rounded posteriorly, slightly angulate on the right side, a shallow impression on the middle of the posterior aspect; intermediate lobe visible on the right side as a large broad wedge. Legs black, the extreme apices of the femora, bases of the tibiæ broadly and apices more narrowly yellowish, the yellow more extensive on anterior pair; tarsi brown, darkened distally; hind trochanters unarmed, with sparse delicate hairs on under surface; hind tibiæ rather slender, on outer surface with a row of fine spines close to upper and lower margins; first tarsal joint somewhat thickened. Wings grayish hyaline, rather long; a long

brown stigma, the distances between apices of auxiliary, first and second veins about equal; anterior cross-vein opposite end of auxiliary vein and at basal third of discal cell; last section of the fourth vein without stump and only slightly sinuate; apex of second vein distinctly beyond posterior cross-vein. Halteres with white stem and dark knob. Length: Body about 3 mm., wing 3 mm.

Female.—Frons narrow, parallel-sided, black posteriorly and with a median ridge extending beyond middle, the anterior third silvery-sericeous. Coloration of body and legs as in the male. Abdomen elongate-ovate, strongly gray pruinose on the sides. Ovipositor yellowish, short, a slender sharp blade extending to base of fifth segment, the fifth and sixth segments expanded beneath and with a deep median groove for the reception of the ovipositor. Length: Body about 2.5 mm., wing nearly 3 mm.

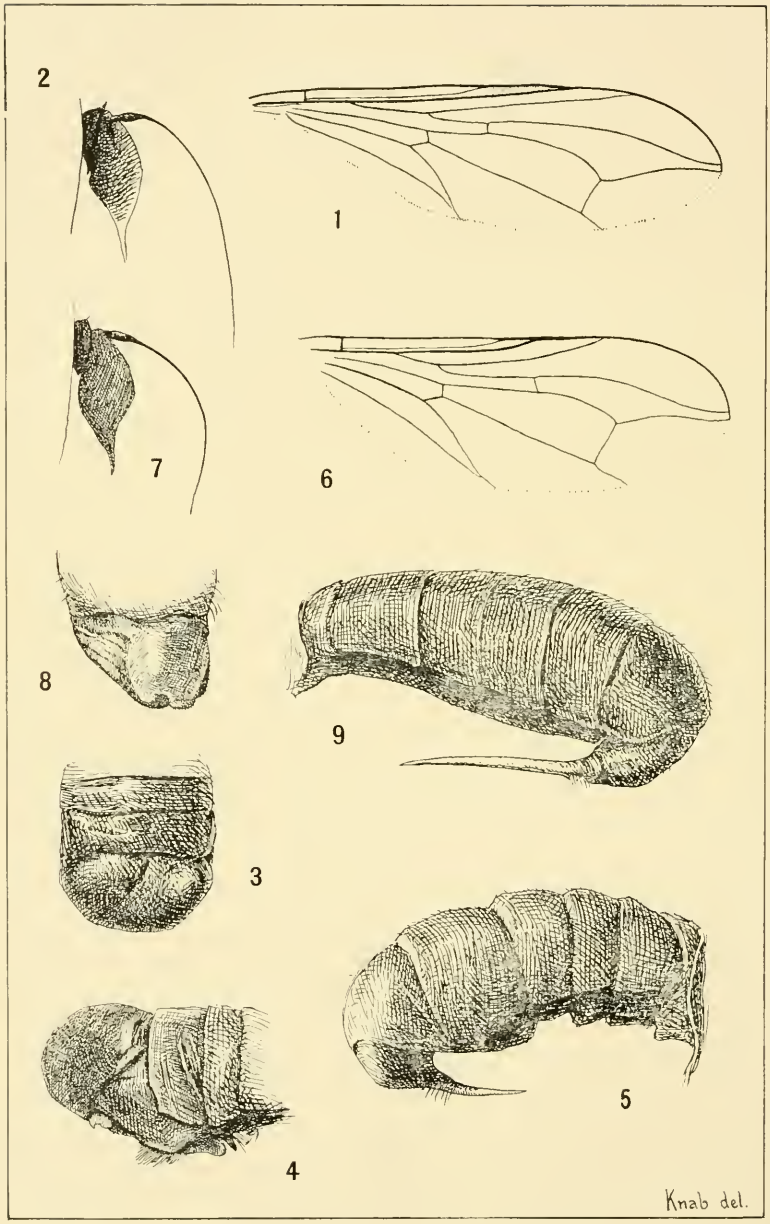
King City and Pleasanton, California, a series of males and females reared from *Eutettix tenella* by W. P. Hartung.

Type: Cat. No. 19,163, U. S. Nat. Mus.

Pipunculus vagabundus new species.

Male.—Frons a narrow wedge extending more than half-way to posterior eye-margin, silvery pollinose; ocellar triangle acute, black, separated from frons by a short contiguous eye-zone. Face silvery, as broad as base of frons. Antennæ black, the third joint abruptly acuminate, drawn out into a sharp point; arista black. Occiput black, shining, the sides silvery. Mesonotum black, subopaque on the disk, more shining at the sides; humeri silvery gray; pleuræ shining black. Scutellum black, shining; postnotum shining black. Abdomen longer than head and thorax together, subfusiform, broadest at apex of second segment; black throughout and without trace of pruinosity, dull basally, becoming shining upon the fifth segment and hypopygium, with scattered short black hairs at the sides. Hypopygium strongly asymmetrical, shorter than the fifth segment, in dorsal view the left portion depressed deeply, canaliculate and with oblique sinuate lateral margin, the thickened portion to the right with a deep apical indentation, the lobe on the right of which projects slightly beyond the general mass. Legs black, the extreme apices of the femora and the bases of the tibiæ yellowish; tarsi brownish yellow, the last joint tinged with black; hind trochanters unarmed; hind tibiæ subclavate and first joint of hind tarsi thickened. Wings rather short, broadly rounded at apex, hyaline, without stigma; anterior cross-vein about opposite apex of first vein and slightly before middle of discal cell; second vein terminating much before posterior cross-vein; last section of fourth vein without stump, sinuate. Halteres white, black at base. Length: Body about 3 mm., wing 2.8 mm.

Female.—Frontal stripe rather broad, slightly widened medianly, silvery pollinose, the ocellar triangle shining black. Occiput shining black in the middle, the sides silvery pruinose. Abdomen wholly black, shagreened, more shining posteriorly, the sixth segment highly polished.



Pipunculus industrius and *P. vagabundus*.

Ovipositor yellow, slender and tapered to a sharp point, reaching to apex of second segment, its base shining black, ovate. Legs stouter than in the male, wings slightly broader. Length: Body about 2.5 mm., wing 2.5 mm.

King City, Cal., one male, and Pleasanton, Cal., 3 females, reared from *Eutettix tenella* by W. J. Hartung; Claremont, Cal., one female (C. F. Baker); Los Angeles County, Cal., one female (D. W. Coquillett).

Type: Cat. No. 19,164, U. S. Nat. Mus.

Explanation of Plate III.

Pipunculus industrius Knab.

1. Wing of male.
2. Antenna.
3. Male hypopygium, dorsal view.
4. The same, right side.
5. Female adbomen.

Pipunculus vagabundus Knab.

6. Wing of male.
7. Antenna.
8. Male hypopygium, dorsal view.
9. Female abdomen.

Vol. XXVIII, pp. 87–88 April 13, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF ACHYRANTHES FROM TOBAGO.

BY PAUL C. STANDLEY.

(Published by permission of the Secretary of the Smithsonian Institution.)

Mr. W. E. Broadway, who by his extensive collections has contributed so much to our knowledge of the flora of Trinidad and Tobago, recently forwarded to the writer, among other plants, specimens of an undescribed *Achyranthes** from Little Tobago Island. This island, which lies just off the northeast coast of Tobago, was unknown botanically until visited by Mr. Broadway in July, 1914. Interest in Little Tobago has been enhanced recently by the fact that Birds of Paradise have been liberated upon it by the owner, Sir William Ingram, proprietor of the Illustrated London News, for whom, at Mr. Broadway's suggestion, the new species of *Achyranthes* is named.

Achyranthes ingramiana Standley, sp. nov.

Stems herbaceous, ascending or decumbent, the branches stout, pilose (especially about the nodes) with slender, smooth, yellowish, ascending or subappressed hairs; petioles slender, 4–8 mm. long, sparsely short-pilose; leaf blades orbicular-ovate or broadly ovate, 2.5–5 cm. long, 2–3 cm. wide, rounded at the base and shortly decurrent, acute at the apex or rarely obtuse, mucronate, succulent, bright green, translucent when dry, sparsely pilose-strigose on both surfaces; peduncles axillary, simple, slender, 1.5–3.5 cm. long, shorter than the leaves, pilose-strigose; spikes solitary, subglobose to short-cylindric, 7–15 mm. long, about 8 mm. in diameter, the flowers stramineous, pediceled within the bracts, the pedicels stout, nearly 1 mm. long, deeply 5-sulcate; bracts and bractlets ovate-deltoid, half as long as the sepals, aristate-acuminate, sparsely short-pilose; sepals narrowly lance-oblong, 3.5 mm. long, acute, thick, short-pilose nearly to the apex, the tips erect or incurved; anthers sessile;

* The generic name *Achyranthes* is used here to designate the group usually known as *Alternanthera*. See, The application of the generic name *Achyranthes*, by Paul C. Standley, Journ. Wash. Acad. Sci. **5**: 72–76. 1915.

staminodia slightly longer than the anthers, ligulate, fimbriate at the apex; seed 1.2 mm. long, dark reddish brown, lustrous.

Type collected along the seashore of Little Tobago Island, July 26, 1914, by Mr. W. E. Broadway, No. 4902 (U. S. Nat. Herb. no. 694,628).

The proposed species is a member of that group separated by Martius as the genus *Mogiphanes*, characterized by the sulcate pedicels of the flowers. In most of the species of *Achyranthes* the flowers are nearly or quite sessile. All the other members of the subgenus *Mogiphanes* have larger flowers, usually 5 mm. long. The leaves of *Achyranthes ingramiana* are characteristic, because of their small size and great breadth. They appear to have been decidedly succulent when growing, but when dry they are very soft and perfectly translucent.

Vol. XXVIII, pp. 89–94 April 13, 1915

PROCEEDINGS

OF THE

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NOTES ON THE SHARKS AND RAYS OF CAPE LOOKOUT, N. C.

BY RUSSELL J. COLES.

In this paper I briefly record some observations made on the sharks and rays which occur in this field. Four species of sharks, *Ginglymostoma cirratum*, *Galeocerdo tigrinus*, *Carcharodon carcharias*, and *Cetorhinus maximus*, have not previously been reported. During fourteen years' fishing in this field I have added twelve of the thirty-one species listed in this paper to local fauna. I am indebted to Mr. Lewis Radcliffe, of the U. S. Bureau of Fisheries, for many suggestions in the preparation of the paper.

1. **Ginglymostoma cirratum** (Gmelin).

NURSE SHARK.

In the summer of 1913, while working in the breakers off the Lookout Shoals for sharks and rays, I noticed a large school of very dark-colored sharks drifting with the tide. These I at first mistook for sand-bar sharks. I soon had a nine-foot specimen hooked and in a short time brought it alongside. The lance with which it was struck rebounded from its tough hide and only after it had been freshly filed to a very sharp point could it be used to kill the shark. The head only was preserved. This is the first record of this species for the coast of North Carolina.

2. **Mustelus canis** (Mitchill).

SMOOTH DOGFISH.

Abundant during May and June; occasionally taken during July.

3. **Galeocerdo tigrinus** Müller & Henle.

In the latter part of June, 1912, a specimen was taken in the bight of Cape Lookout, which from a personal examination of the teeth and the

description of its color markings and general appearance as described by those who saw it, I am assured was this species. This form has not heretofore been recorded on the North Carolina coast.

4. **Carcharhinus acronotus** (Poey).

SHARP-BACKED SHARK.

The first record of this rare shark for the coast of the United States was a specimen, three feet long, taken by me in the bight of Cape Lookout in July, 1911. During July, 1914, I captured six specimens in the bight of Cape Lookout.

5. **Carcharhinus lamia** (Rafinesque).

CUB-SHARK.

Of this shark I have secured three specimens, one each for the years 1902, 1906, and 1913. These are the only records for this species on the North Carolina coast. The one taken in 1902 was originally identified as *C. milberti.*

6. **Carcharhinus limbatus** (Müller & Henle).

In July, 1910, I had the good fortune to add this shark to the fauna of North Carolina.

7. **Hypoprion brevirostris** Poey.

This shark, which had first been recorded in this field by Mr. Lewis Radcliffe in 1912, was first seen by the writer during the latter part of July, 1913. I succeeded in capturing two examples on Lookout Shoals, one containing early embryos.

8. **Scoliodon terræ-novæ** (Richardson).

SHARP-NOSED SHARK.

With the exception of a short period during the winter and spring, this small shark is very abundant in this region.

9. **Sphyrna tiburo** (Linnæus).

BONNET-NOSED SHARK.

This shark is fairly abundant from June first to October, but not so common as the hammer-head.

10. **Sphyrna zygæna** (Linnæus).

HAMMER-HEADED SHARK; HAMMER-HEAD.

Contrary to the opinion of former writers, this is one of the most abundant sharks in this region during the summer months. On one occasion I hauled to the beach in a large seine, sixty-five specimens of this shark, averaging about four feet in length. In 1910 I captured a female which was 14¼ feet in length. After capture this fish gave birth to five young

ones averaging 29 inches in length. I have often captured these fish with rod and reel and find them very game fighters.

11. **Alopias vulpes** (Gmelin).

WHIP-TAIL SHARK; THRESHER SHARK.

The first example of this species in this region was recorded by Mr. Lewis Radcliffe in April, 1913. Late in July, 1914, I saw a shark of this easily identifiable species in the bight of Cape Lookout. Although I was very close to it, I did not have my harpoons at hand and could not capture it. At the time of observation, it was feeding in shallow water by throwing the fish to its mouth with its tail, and I saw one fish, which it failed to seize, thrown for a considerable distance, clear of the water.

12. **Carcharias littoralis** (Mitchill).

SAND-BAR SHARK.

Not a regular habitant of this field. They occasionally arrive in large schools, especially on the shoals extending out beyond Cape Lookout, where they prove very troublesome to the blue-fish fishermen. This shark works in a more systematic way in securing its food than any shark of which I know. On one occasion I saw a school of a hundred or more surround a school of blue-fish and force them into a solid mass in shallow water, and then at the same instant the entire school of sharks dashed in on the blue-fish. On another occasion with a large school of blue-fish in my net, a school of these sharks attacked it from all sides and ate or liberated the school of blue-fish, practically ruining the net. Again in July, 1914, on Lookout Shoals, I had a large net filled with blue-fish attacked by a school of about 200 of these vicious sharks and the net ruined. I killed about twenty of them with harpoon and lance. Their average length was slightly in excess of eight feet. Several of those examined contained many eggs and embryos of length of over nine inches.

13. **Carcharodon carcharias** (Linnæus).

GREAT WHITE SHARK; MAN-EATER.

In 1905, while out in a small skiff, harpooning turtles, a huge shark of more than twenty feet in length appeared alongside, within reach of my hand. It apparently had no fear of us, as it struck the side of the skiff with some force. It then swam away for a distance of several hundred yards, then turned and swam rapidly toward us. I was about to fire into it as a large logger-head turtle arose to the surface and was attacked by the shark. The shark seized the turtle in its jaws and both disappeared beneath the surface. The next day I harpooned this turtle and found the upper shell for a width of nearly thirty inches showing the marks of the shark's teeth. The edge of the shell and the right hind flipper had been torn away. In 1913 I observed three of these sharks and succeeded in harpooning them, but my tackle was too light to hold them. While I was unable to positively identify these sharks, I believe they were man-eaters.

14. **Cetorhinus maximus** (Gunner).

BASKING SHARK.

In July, 1905, while trolling out from Cape Lookout, what was mistaken for a whale was espied lying apparently motionless on the surface of the water. As we approached it it became apparent that it was a shark and of a length in excess of forty feet. When within twenty yards of it, as I was preparing to strike with the harpoon, it suddenly disappeared. About the same time a fish of this size was sighted by native fishermen, three miles off the sea buoy on Beaufort bar, and was probably the same example.

15. **Squalus acanthias** Linnæus.

BONE SHARK.

This shark is very abundant around Cape Lookout in April and first week of May. I have taken two specimens on the first of January on the rocks off New River Inlet.

16. **Squatina squatina** (Linnæus).

JAKIE.

This species is a regular visitor at Cape Lookout, arriving the latter part of March and leaving about the first of May. For a short period it is quite abundant.

17. **Pristis pectinatus** Latham.

SAWFISH.

An annual visitor at Cape Lookout in small numbers only. It is usually found in the breakers of Lookout Shoals. I have observed no small examples of this fish, none of the nine specimens handled by me being under 12½ feet.

18. **Rhinobatus lentiginosus** Garman.

GUITAR FISH.

Exceedingly rare. In fourteen years I have captured only four specimens, as follows: two, females, 30 inches in length, taken July 23, 1912; a male 17½ inches in length, taken July 27, 1912; and an example 21¾ inches long, taken in July, 1913.

19. **Raja lævis** (Mitchill).

SMOOTH SKATE.

Captures of this large skate in this field are exceedingly rare. I have taken them with a width of four feet, on the rocks far off shore, early in January, and believe that when the value of off-shore winter fishing is more fully appreciated they will be found in much greater numbers.

20. **Raja eglanteria** Bosc.

CLEAR-NOSE; BRIER RAY.

This ray is quite abundant around Cape Lookout from the middle of April to the middle of May. I have one record for July.

21. **Narcine brasiliensis** (Ölfers).

SMALL ELECTRIC RAY; SHOCK FISH.

In 1909 it was my good fortune to add this interesting electric ray to this region, as well as to the east coast of the United States. During each succeeding year I have noted that this fish arrives in the bight of Cape Lookout on the night of June 29, and departs on the night of July 4. It is seen in this region at no other time during the year.

22. **Urolophus jamaicensis** (Cuvier).

In June, 1911, I captured a small example of this West Indian ray at Cape Lookout. This species had not previously been reported as occurring on this coast.

23. **Dasyatis hastata** (Dekay).

STING RAY.

In July, 1910, at Cape Lookout, I captured a 64-pound female, which gave birth to five young rays while she was being killed. This species had not previously been reported as occurring on this coast.

24. **Dasyatis say** (Le Sueur).

STING RAY.

The commonest of all the sting rays in this region. It can be found there from the first of May till November.

25. **Pteroplatea maclura** (Le Sueur).

SAND SKATE; BUTTERFLY RAY.

This ray is very common in this region. Most of the specimens seen are less than a foot in width. I have occasionally seen individuals more than 2½ feet in width.

26. **Pteroplatea altavela** (Linnæus).

A new addition to the fauna of North Carolina, and the first definite record for North America, was made on May 22, 1914, by the capture of a large female of this species near Cape Lookout. The width of the disc of this specimen was six feet ten inches. It was captured by Mr. Charles W. Willis, the captain of my boat and member of crew. From this specimen four well-developed embryos were taken; the largest had a width of 17½ inches and the smallest 15 inches. All had well-developed spines on the tails.

I was informed later by a native fisherman that at about the same date he caught in his seine in the bight of Cape Lookout, two large rays, which he described as follows: "They were the biggest sand skates that I ever saw and they had stings on their tails." I am convinced that the North Carolina coast was at that time visited by a school of these rays.

27. **Aëtobatus narinari** (Euphrasen).

SPOTTED STING RAY; LADY SKATE.

This species visits the Cape Lookout region in considerable numbers. I have killed as high as fifty in a single season, some of them of large size, the largest being 12 feet in length and 7 feet 7 inches broad.

28. **Myliobatis freminvillei** Le Sueur.

EAGLE RAY.

Never abundant, but I observe a few examples each year. I have noted that this species gives birth to its young in pairs of two folded together with head and tail in reverse position, there being three pairs.

29. **Rhinoptera bonasus** (Mitchill).

COW-NOSED RAY.

This ray is not abundant. I rarely see more than a half dozen specimens in a single season, and some years I have seen none at all.

30. **Mobula ölfersi** (Müller & Henle).

SMALL DEVILFISH.

In July, 1910, I first captured this rare and practically unknown devilfish which had not previously been reported on this coast. Each year I have recorded the time of their arrival and find the dates to be the same. They first arrive in the bight of Cape Lookout on the night of July 6, leave during the night of July 9, and return again on the night of July 24, leaving during the night of the 29th. They are later seen for some days, playing on Lookout Shoals. They are seen at no other season of the year. During the past four years I have captured nearly fifty of them, yet they appear to arrive in about the same number each year, in a school of about 100.

31. **Manta birostris** (Walbaum).

DEVILFISH.

In July, 1909, I saw one of these rays, having a width of at least twenty feet, leap from the water. In less than a minute it leaped the second time, its form and the two cephalic appendages being plainly visible.

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PROCEEDINGS

OF THE

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NEW FRESH-WATER CRABS (PSEUDOTHELPHUSA) FROM COLOMBIA.*

BY MARY J. RATHBUN.

The material described forms part of the collection obtained by the Walker Expedition which was sent by the University of Michigan to Santa Marta, Colombia, in 1913. The Crustacea as a whole will be reported on by Dr. A. S. Pearse. As, however, Doctor Pearse lacks a reference collection of Potamonidæ with which to compare the species of *Pseudothelphusa*, he has turned over to me the specimens of that genus for description. The new forms will be figured in Doctor Pearse's report.

The species here described all possess a type of maxilliped which exists only in Colombia, Ecuador, Peru, and Bolivia; the merus is subtriangular, its outer margin being straight or a little concave, not broadly rounded as in species from Mexico, Central America, the West Indies, and some parts of South America, including Colombia.

Pseudothelphusa pearsei sp. nov.

Holotype.—Adult male, Cat. No. 45,872, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. Collected at the Cincinnati Coffee Plantation, Santa Marta Mountains, Colombia, 4500 feet elevation, under log, by Dr. A. S. Pearse, July 2, 1913. Orig. No. 7.

Measurements.—Holotype male, length of carapace on the median line 19.6 mm., width of carapace 33.2 mm., width between outer angles of orbits 20 mm., width of front above, between the eyes, 10 mm., length of larger propodus below 26 mm., greatest height of palm (near middle) 9.6 mm., greatest thickness of palm 7.1 mm., length of dactylus of cheliped 13.2 mm.

* Published by permission of Dr. A. G. Ruthven, Director of the Museum of Zoology, University of Michigan.

Description.—Carapace slightly convex, surface paved with flattened granules among which are good-sized punctæ visible to the naked eye; cervical suture sinuous and at its middle part deep; H-depression well marked. Lateral margins roughened by small, blunt, irregular teeth; two larger teeth are placed, one at the cervical suture, and the other, obtusangled, a little behind the orbit. Front with a broad median V-sinus above which separates two slightly sinuous and oblique lobes as seen from above; from in front the lobes slope downward toward the middle; the edge overhangs the surface of the front and is tuberculated, the tubercles flat and not in a single row; the lower edge of the front is deeply sinuous, three-lobed; surface of front deepest at outer ends, although the middle lobe reaches a little lower down than the outer lobes. Orbits in front view oblique, margins sub-rhomboidal.

The orifice of the efferent branchial channel is almost closed, as the antero-lateral angle of the buccal cavity is produced in a spine which meets or nearly meets the lateral lobe of the epistome.

Merus of outer maxilliped subtriangular, its outer margin concave or nearly straight until near the distal end where it forms an angle or lobe just behind the summit of the segment. Ischium widest a little behind the distal end, the outer margin being sinuous. Exognath slender, about ⅔ as long as ischium of endognath.

Chelipeds noticeably unequal, roughened, the granules of the merus fine and arranged more or less in transverse rugæ; inner margin armed with triangular teeth increasing in size toward the distal end of the segment; surface of carpus, propodus and dactylus similar to that of carapace but rougher; carpal tooth short, blunt; palm with lower edge swollen, upper edge nearly straight; fingers meeting when closed, and armed with broad, low teeth.

Abdomen of male with sides convex from the third segment to the extremity; appendages of first segment armed distally with three lobes, one stout at the external angle, two slender and overlapping at the middle.

Relationships.—This species in its shape is near *P. colombiana* Rathbun,* but differs in several important particulars: The shape of the merus of the maxilliped is altogether different, in *P. pearsei* the outer margin is straight, forming an angle with the anterior margin, while in *P. colombiana* the outer margin is convex and curves into the anterior margin. *P. pearsei* has two enlarged teeth on the antero-lateral margin, while *P. colombiana* has in their places only slight interruptions in the margin. The upper edge of the front is more horizontal, and the lower edge less sinuous in *P. colombiana* than in *P. pearsei.*

In my key to the species of the genus *Pseudothelphusa,*† the species *pearsei* would come directly after *colombiana,* on p. 275.

Record of specimens.—Cincinnati Coffee Plantation, Santa Marta Mountains, 4500 feet, under stone in brook, A. S. Pearse, July 2, 1913,

* Proc. U. S. Nat. Mus., vol. 16, 1893, p. 653, pl. 74, fig. 10, pl. 75, fig. 1.

† Nouv. Arch. Mus. Hist. Nat., Paris, ser. 4, vol. 7, 1905, pp. 273–276.

2 ♀, Orig. No. 5, Cat. Nos. 45,726, 45,876.* Cincinnati Coffee Plantation, 4500 feet, under log, A. S. Pearse, July 2, 1913, 1 ♂ holotype, Orig. No. 7, Cat. No. 45,872. Cincinnati Coffee Plantation, 4500 feet, under logs, F. M. Gaige, July 2, 1913, 5 ♂ 5 ♀ 5 juv., Orig. No. 8, Cat. Nos. 45,863, 45,879. Southeast of Cincinnati Coffee Plantation, 4800 feet, in forest, A. S. Pearse, July 2, 1913, 1 ♀, Orig. No. 15, Cat. No. 45,869. Cincinnati Coffee Plantation, under stones in damp creek bed, A. S. Pearse, July 3, 1913, 13 ♂ 8 ♀ 7 juv., Orig. No. 18, Cat. No. 45,721. Cincinnati Coffee Plantation, 4000 feet, under stones in creek bed, but not in water, A. S. Pearse, July 3, 1913, 2 ♂ 1 ♀ 6 juv., Orig. No. 19, Cat. Nos. 45,721, 45,865. Cincinnati Coffee Plantation, 3800 feet, in bottom of stream, A. S. Pearse, July 3, 1913, 1 ♀ juv., Orig. No. 22, Cat. No. 45,875. Cincinnati Coffee Plantation, 4800 feet, walking over ground during rain, F. M. Gaige, July 3, 1913, 1♂ 3 ♀, Orig. No. 25, Cat. No. 45,720. Cincinnati Coffee Plantation, 3800 feet, in burrow under rock beside stream, A. S. Pearse, July 4, 1913, 2 ♂ 3 ♀, Orig. No. 27, Cat. No. 45,719. Cincinnati Coffee Plantation, over 4000 feet, walking in a creek, A. S. Pearse, July 4, 1913, 1 ♀ with many young, Orig. No. 34, Cat. No. 45,724. South of Cincinnati Coffee Plantation, in forest, under stones in dry creek bed, A. S. Pearse, July 5, 1913, 2♂ 2 juv., Orig. No. 40, Cat. No. 45,861. Cincinnati Coffee Plantation, 4200 feet, in cavity in stump, A. S. Pearse, July 5, 1913, 2 ♀, Orig. No. 44, Cat. No. 45,859. Cincinnati Coffee Plantation, 3500 feet, under stone, A. G. Ruthven, July 5, 1913, 1 ♀, Orig. No. 47, Cat. No. 45,870. Santa Marta Mountains, 4600 feet, under logs in forest, A. G. Ruthven, July 7, 1913, 1 ♂, Orig. No. 55, Cat. No. 45,717. Cincinnati Coffee Plantation, 5000 feet, in rill in cornfield, A. S. Pearse, July 8, 1913, 1 ♂, Orig. No. 56, Cat. No. 45,862. South of Cincinnati Coffee Plantation, in gully in forest, A. S. Pearse, July 9, 1913, 1 ♀, ovig., Orig. No. 66, Cat. No. 45,718. Cincinnati Coffee Plantation, 4500 feet, Clara Flye, July 10, 1913, 1♂, Orig. No. 76, Cat. No. 45,871. Cincinnati Coffee Plantation, 4000 feet, Clara Flye, July 11, 1913, 1 ♀, Orig. No. 78, Cat. No. 45,723. Cornfield at south end of Cincinnati Coffee Plantation, 4500 feet, F. M. Gaige, July 12, 1913, 1 ♀, Orig. No. 81, Cat. No. 45,722. Below Cincinnati Coffee Plantation, 4000 feet, in creek under stone, A. S. Pearse, July 16, 1913, 1 ♂ juv., Orig. No. 102, Cat. No. 45,878. San Lorenzo Mountain, 4700 feet, under stones in dry creek bed in forest, A. S. Pearse, July 17, 1913, 2 ♂, Orig. No. 114, Cat. No. 45,715. Near Cincinnati Coffee Plantation, 4200 feet, A. G. Ruthven, July 17, 1913, 1 juv., Orig. No. 115, Cat. No. 45,868. Cincinnati Coffee Plantation, 4500 feet, Clara Flye, July 21, 1913, 1 ♀, Orig. No. 147, Cat. No. 45,725. Cincinnati Coffee Plantation, 4200 feet, in creek, Clara Flye, July 24, 1913, 2 ♀ 2 juv., Orig. No. 175, Cat. Nos. 45,860, 45,866. Cincinnati Coffee Plantation, 4200 feet, in creek, Clara Flye, July 26, 1913, 1 juv., Orig. No. 183, Cat. No. 45,728.

Remarks.—The type was chosen for its good preservation. There are larger specimens in the collection. The largest male (45,720) measures

* The catalogue numbers are those of the Museum of Zoology, University of Michigan.

25.2 by 44.2 mm., the largest hard-shell female (45,722) is 31.3 by 57.2 mm.; a thin-shell female (45,873) is about 1 mm. larger.

A female (45,724) is accompanied by over 50 young in the first free-swimming stage; some of them are still attached to the abdomen; they have the general form of the adult; the upper margin of the front is just beginning to develop; the exognath is longer than in larger specimens but does not reach end of ischium; the efferent branchial orifice is open, the jugal spine not yet developed.

One female (45,721) has the left cheliped represented by a very short stump; the right cheliped is of normal size but the fingers are strongly bent, the immovable finger outward and the dactylus inward so that their planes form an angle of about 55°.

Pseudothelphusa angulata sp. nov.

Holotype.—Adult male, Cat. No. 45,880, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. Collected above Minca, Santa Marta Mountains, Colombia, 2900 feet elevation, under stones bordering a rill, July 10, 1913.

Measurements.—Holotype male, length of carapace on the median line 40 mm., width of carapace 65 mm., width between outer angles of orbits 32 mm., width of front above, between the eyes, 15.3 mm., length of larger propodus below 52.7 mm., height of palm at distal end 19.9 mm., greatest thickness of palm 14.6 mm.; length of dactylus of cheliped (approx.) 27.2 mm.

Description.—This species in its shape and ornamentation resembles the preceding, but is somewhat larger. The front is narrower and the orbits higher. The orifice of the efferent branchial channel is wide open behind. The merus of the outer maxilliped is similar in shape to that of *pearsei*, having a concave outer margin, but that margin forms at its union with the anterior margin a very prominent angle or lobe, to which the specific name refers. Exognath very short, about ¼ as long as ischiognath. Chelipeds rougher than in *pearsei*, carpal tooth acute.

Shape of male abdomen subtriangular after the third segment. Appendage of first segment with a large outer lobe near the end; tip subtruncate, with a short projecting point.

Relationships.—Near *P. monticola* Zimmer* but distinguished as follows: In *monticola* the outer margin of the merognath is not concave and the antero-external angle not so well marked or so advanced; the penultimate segment of the abdomen is shorter; the lobe on the outer edge of the first abdominal segment is more evenly rounded, not subtriangular as in *angulata*.

Pseudothelphusa clausa sp. nov.

Holotype.—Adult male, Cat. No. 45,864; Museum of Zoology, University of Michigan, Ann Arbor, Michigan. Collected in brooklet,

* Mém. Soc. neuchâteloise Sci. nat., vol. 5, 1912, p. 3, pl. 1, figs. 3 and 4, text-figs. 6–10.

Cincinnati Coffee Plantation, Santa Marta Mountains, Colombia, 4500 feet elevation, by M. A. Carriker, July 10, 1913, Orig. No. 75.

Measurements.—Holotype male, length of carapace on the median line 15.3 mm., width of carapace 26.6 mm., width between outer angles of orbits 15.5 mm., width of front above, between the eyes, 8.3 mm., length of larger propodus below 25.2 mm., greatest height of palm (near middle) 10.3 mm., greatest thickness of palm 7.3 mm., length of dactylus of cheliped, 13 mm. Largest female, length 18, width 32 mm.

Description—A small species. Carapace smooth to the eye, very finely granulate and furrowed, punctæ visible without a lens; cervical suture straight and deep for the greater part of its length, but almost imperceptible toward the middle of the carapace and toward the margin. Lateral margins almost entire; a broad emargination just behind the orbit, and a number of inconspicuous teeth behind the cervical suture. Front without definite upper limit, the dorsal surface of the carapace rounding gradually downward to the sinuous or quadrilobate lower margin. Orbits nearly transverse, upper and lower margins subparallel.

Orifice of efferent branchial channel completely rimmed but in a different way from *P. pearsei*. In *clausa* the outer end of the epistome is produced laterally in a long spine, which meets an oblong prominence of the jugal area.

Merus of outer maxilliped with outer margin very oblique, and nearly straight, with only a very shallow sinus behind the articulation with the carpus; ischium a little narrowed at distal end; exognath between ⅔ and ¾ as long as ischium.

Chelipeds very unequal; merus very rough above, irregularly toothed within; tooth of carpus short, subacute; fingers gaping; a tooth at the extreme proximal end of the immovable finger gives a peculiar appearance to the large chela.

The sides of the male abdomen are as a whole somewhat convex after the third segment although the margins of the segments are separately concave. The appendages of the first segment viewed from the inside are slightly constricted behind the extremity, which is oblique and arcuate and produced at either end; an upward-pointing tooth projects from the distal surface.

Relationships.—In my key (*op. cit.*) this species would fall under *a*, *b*, *c'*.

Variations.—The front is not always distinctly four-lobed, as the median emargination is at times so slight as to be almost imperceptible.

Record of specimens.—Cincinnati Coffee Plantation, Santa Marta Mountains, Colombia, 4500 feet, under logs, F. M. Gaige, July 2, 1913, 1 ♂ 1 ♀ 1 juv., Orig. No. 8, Cat. No. 45,879. In forest south of Cincinnati Coffee Plantation, 4200 feet, A. S. Pearse, July 2, 1913, 1 ♀ 6 juv. (first free stage), Orig. No. 14, Cat. No. 45,874. Cincinnati Coffee Plantation, 4100 feet, under stones near creek, A. S. Pearse, July 3, 1913, 1 ♂ 6 juv., Orig. No. 19, Cat. No. 45,877. Cincinnati Coffee Plantation, 4800 feet, walking over ground during rain, F. M. Gaige, July 3, 1913, 1 ♂

juv., Orig. No. 25, Cat. No. 45,720. In forest south of Cincinnati Coffee Plantation, under stones in dry creek bed, A. S. Pearse, July 5, 1913, 1 ♂ 2 ♀, Orig. No. 40, Cat. No. 45,861. South of Cincinnati Coffee Plantation, 4000 feet, under stones, F. M. Gaige, July 5, 1913, 2 ♀, Orig. No. 46, Cat. No. 45,867. Santa Marta Mountains, 4600 feet, under logs in forest, A. G. Ruthven, July 7, 1913, 2 ♀, Orig. No. 55, Cat. No. 45,717. Cincinnati Coffee Plantation, 4500 feet, from brooklet, M. A. Carriker, July 10, 1913, 1 ♂ holotype, Orig. No. 75, Cat. No. 45,864. Cincinnati Coffee Plantation, 4200 feet, in creek, Clara Flye, July 26, 1913, 1 ♀, Orig. No. 183, Cat. No. 45,728.

Pseudothelphusa ruthveni sp. nov.

Holotype.—Adult female, Cat. No. 45,716, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. Collected at south end of Cincinnati Coffee Plantation, Santa Marta Mountains, Colombia, 2500 feet elevation, by Dr. A. G. Ruthven, July 4, 1913, Orig. No. 33.

Measurements.—Holotype female, length of carapace on the median line 19.8 mm., width of carapace 35 mm., width between outer angles of orbits 21 mm., width of front above, between the eyes, 9.7 mm., length of larger propodus below 26 mm., greatest height of palm (near middle) 9 mm., greatest thickness of palm 6.4 mm., length of dactylus of cheliped 14.6 mm.

Description.—The dorsal aspect is much like that of *P. clausa*. The size is greater, the punctæ are proportionally larger, lateral teeth more prominent and surface near them rougher; cervical suture more sinuous, epigastric lobes higher. Front trilobate, middle lobe lower down than lateral lobes. Orifice of efferent branchial channel closed and similar to that of *P. pearsei*, the jugal angle being prolonged in a spine which meets the lateral tooth of the epistome. Outer margin of merus of maxilliped nearly straight up to the articulation with the carpus; sides of ischium subparallel; exognath reaching very nearly to end of ischium.

Fingers longer and slenderer in proportion to palm than in *clausa;* larger prehensile teeth narrower and more separated than in *clausa*, most noticeable in the smaller chela.

Vol. XXVIII, pp. 101–102 April 13, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPIDER MONKEY FROM PANAMA.

BY E. A. GOLDMAN.

In determining the collection of mammals made in the course of the Smithsonian Biological Survey of the Panama Canal zone (1911–1912), a black spider monkey obtained in the eastern part of Panama was provisionally referred to *Ateles ater* F. Cuvier of Guiana, a species first recorded from Panama by Sclater.* More recent comparisons, however, with material from various sources including the type and a topotype of *Ateles robustus* Allen from western Colombia, kindly loaned by Dr. J. A. Allen of the American Museum of Natural History, indicate that the specimen represents a new form described below.

Ateles dariensis sp. nov.

DARIEN BLACK SPIDER MONKEY.

Type from near head of Rio Limon (altitude 5200 feet), Mount Pirri, eastern Panama. No. 179,044, female adult (teeth slightly worn), U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 29, 1912. Original number 21,664.

General characters.—A rather small long-tailed black spider monkey of the *Ateles ater* group. Similar in total length to *Ateles robustus* of western Colombia, but tail longer and head and body correspondingly shorter (tail nearly twice as long as head and body, instead of only a little longer as in *A. robustus*); skull differing especially in the greater posterior extension of the palate, and the peculiar flattened condition of the audital bullæ. Apparently differing from *A. ater* in relatively longer tail, smaller general size, and in cranial details.

Color.—Face and entire pelage uniform deep glossy black, except a few whitish hairs on the middle of the forehead and about the mouth.

Skull.—Similar to that of *A. robustus*, but smaller, the frontal region more elongated anteriorly; zygomatic portion of jugal more expanded

* Proc. Zool. Soc. Lond., 1872, p. 5.

vertically; palate longer, reaching posteriorly beyond the posterior plane of last molars, the greater extension due to expansion of the palatines; audital bullæ much flattened and angular instead of rounded and inflated, the outer edges overlapped by extensions of the alisphenoids and squamosals, molariform teeth smaller; upper premolars less extended anteroposteriorly, the anterior of the series more distinctly smaller than the second. Contrasted with a skull without definite locality, but believed to be from the Lower Amazon or Guiana and assumed to represent *A. ater*, the frontal region is similarly prominent and the palate as a whole is of about the same length, but the palatine portion of the bony shelf is longer, reaching anteriorly to the posterior plane of first molars; the zygomatic portion of the jugal is much heavier, more expanded vertically, and the audital bullæ much smaller, less inflated.

Measurements.—Type: Total length, 1260; tail vertebræ, 810; hind foot, 170. *Skull* (type): Greatest length, 113.9; occipitonasal length, 98.3; basal length, 79; breadth of braincase, 59; zygomatic breadth, 65.7; orbital breadth, 57.3; postorbital breadth, 44.7; breadth of rostrum at canines, 26.2; greatest width of nasals anteriorly, 10.4; palatal length, 35.5; upper molar series, 22; lower molar series, 27.

Remarks.—The Darien representative of the *A. ater* group is externally distinguished from its geographic neighbor, *A. robustus* of Colombia, by the proportionately longer tail; the skull may be known by the posterior extension of the palate beyond the last molars. Its exact relationship to *A. ater* of Guiana is somewhat problematical owing to unsatisfactory material for comparison, but the latter appears to be a shorter-tailed animal with cranial differences already pointed out. Moreover, the cranial measurements given by Elliot* indicate that *A. ater* is a larger animal. *Ateles rufiventris* Sclater, which was described from the Rio Atrato and may range north to Panama, seems amply distinguished by its color.

Specimens examined: One, the type.

* Rev. Primates, vol. 2, p. 30, 1913.

Vol. XXVIII, pp. 103–104 May 27, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW BOB-WHITE FROM COLORADO.

BY F. C. LINCOLN.

Examination of a series of Bob-whites from northeastern Colorado reveals characteristic differences, warranting their separation as a distinct subspecies, which may be known as follows:*

Colinus virginianus taylori new subspecies.†

Type specimen.—Adult male; Cat. No. 4326, Colo. Mus. of Nat. Hist.; Collected at Laird, Yuma Co., Colo., by F. C. Lincoln; January 27, 1915.

Characters.—Size averaging slightly smaller than *Colinus v. virginianus* Linnaeus, with upper parts much lighter and grayer, and dark areas of back, tertials, and scapulars sharply defined and less mottled with brown. Vermiculations finer or absent. Bill shorter and deeper at base.

Male.—White of throat and belly immaculate or but faintly shaded with pale buff or cream-color. Black patch of lower throat broad and well defined. Purplish or vinaceous band on upper chest restricted or totally absent. Lateral bars of under parts broad and nearly transverse. Flanks light cinnamon. Triangular patch on upper back well shaded with purplish or vinaceous. Dark markings well defined and much less mottled with brown. Edgings of scapulars and tertials pale buff to creamy white. Rump and upper tail coverts pale olive gray.

Female.—Similar to female of *virginianus* but bars on lower parts broader, flanks lighter and tail more heavily shaded with vinaceous.

* It is the intention of the writer to prepare for publication a review of the genus *Colinus*.

† I take pleasure in naming this proposed form in honor of Mr. Frank M. Taylor of Denver.

Vol. XXVIII, pp. 105–108 May 27, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF SOME NEW FORMS OF AMERICAN CUCKOOS, PARROTS, AND PIGEONS.

BY ROBERT RIDGWAY.

[By permission of the Secretary of the Smithsonian Institution.]

The following new forms will be described more fully in Part VII, Bulletin 50, U. S. National Museum ("Birds of North and Middle America").

Coccyzus minor palloris subsp. nov.

Type, adult ♀, U. S. Nat. Mus., No. 198,745, Pigres, w. Costa Rica, February 3, 1905. Collected by R. Ridgway.

Agreeing with *C. m. minor* in absence of gray tinge to buff of suborbital and subauricular regions, sides of neck and chest, but much larger and paler, the under parts pale cream-buff, and pileum distinctly grayer than back, passing into clear gray anteriorly; closely resembling *C. m. maynardi* in color of upper parts and posterior under parts, but anterior under parts wholly pale buff, concolor with posterior portions, and decidedly larger. Wing, 142; tail, 153.5; culmen, 30; tarsus, 28; middle toe, 21.5 mm.

Coccyzus minor rileyi subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 191,153, Barbuda, Lesser Antilles, August 23, 1903. Collected by H. G. S. Branch.

Similar in coloration to *C. m. nesiotes*, but decidedly larger; similar to *C. m. vicentis*, but smaller, color of upper parts slightly grayer and bill narrower (in lateral profile) and decidedly more compressed. Wing, 141; tail, 162; culmen, 30 mm.

Morococcyx erythropygus mexicanus subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 29,235, Juchitán, Oaxaca, Mexico, March, 1862. Collected by F. Sumichrast.

Similar to *M. e. erythropygus* but larger and paler, the upper parts averaging more grayish olive, the under parts varying from cinnamon-

ochraceous to dull light ochraceous-buff or even pale buff; under surface of tail, however, darker, showing on lateral rectrices less contrast between the grayish brown of proximal and blackish subterminal portions. Wing, 101; tail, 142.5; culmen, 25.5; tarsus, 36; middle toe, 23.5 mm.

Ara militaris mexicana subsp. nov.

Type, adult ♂, U. S. Nat. Mus. (Biological Survey), No. 155,409, Manzanillo, Mexico, February 5, 1892. Collected by E. W. Nelson (orig. No. 40).

Similar to *A. m. militaris* but larger. Measurements of type.—Wing, 385; tail, 435; culmen, 63; tarsus, 34.5; outer anterior toe, 44 mm.

Conurus holochlorus strenuus subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 91,098, Ometepe, Nicaragua, February 23, 1883. Collected by C. C. Nutting (orig. No. 654).

Similar in coloration to *C. h. holochlorus* (from eastern Mexico) but decidedly larger, especially the bill and feet. Measurements of type.—Wing, 173.5; tail, 139; culmen, 28.5; tarsus, 19.5; outer anterior toe, 26 mm.

Grammopsittaca lineola maculata subsp. nov.

Type, U. S. Nat. Mus., No. 106,056, adult (sex not determined), Eastern Peru?

Similar to *G. l. lineola* but rump and upper tail-coverts much more heavily spotted with black, and general color deeper, more olivaceous, green. Measurements of type.—Wing, 108, tail, 60.5; culmen, 12 mm.

Amazona vittata gracilipes subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 169,034, Culebra Island, West Indies, February 11, 1899. Collected by A. B. Baker.

Similar to *A. v. vittata* but smaller, with relatively smaller and more slender feet. Measurements of type.—Wing, 175; tail, 95; culmen, 26.5; tarsus, 21; outer anterior toe, 25 mm.

Notiœnas * gen. nov.

Similar to *Chloræenas* but tarsus longer than middle toe (without claw); tail much shorter than in *Palumbæna* † (only half as long as wing); bill smaller (length from frontal antia less than distance from same point to anterior angle of eye); plumage of neck not metallic.

Type, *Columba maculosa* Temminck.

Chloræenas inornata exsul subsp. nov.

Type, adult (sex not determined), U. S. Nat. Mus., No. 236,736, Porto Rico.

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* Νότιος, southern; οἶνας, a wild pigeon.

† *Palumbæna* Bonaparte, Consp. Gen. Av., ii, 1857, 49; type, *Columba ænas* Linnæus.

Similar to *C. i. inornata* but coloration slightly deeper, the forehead nearly, if not quite, concolor with rest of pileum, and white edgings to distal wing-coverts averaging broader; similar also to *C. i. exiqua* but coloration less deep. Measurements of type.—Wing, 216.5; tail, 131; culmen, 17; tarsus, 27.5; middle toe, 36 mm.

Zenaidura macroura tresmariæ subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 156,700, Marie Madre Island, Tres Marias group, May 5, 1897. Collected by Nelson and Goldman.

Similar to *Z. m. carolinensis*, but adult male with forehead, anterior and lateral portions of crown, and supra-auricular region (sides of occiput) bright fawn color, approaching sayal brown, conspicuously deeper than color of chest; chin buffy white, abruptly contrasted with adjacent light vinaceous-fawn color, and with back and distal wing-coverts darker. Measurements of type.—Wing, 144; tail, 126; culmen, 14; tarsus, 19.5; middle toe, 20.5 mm.

Zenaida ruficauda robinsoni subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 236,767, Honda, Colombia, July 14, 1892. Collected by Lieut. Wirt Robinson, U. S. A.

Similar to *Z. r. vinaceo-rufa* but coloration deeper, more brownish above, more vinaceous below. Measurements of type.—Wing, 137.5; tail, 86.5; culmen, 15.5; tarsus, 21; middle toe, 21 mm.

Melopelia asiatica mearnsi subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 121,177, five miles north of Nogales, Arizona, June 2, 1891. Collected by P. L. Jouy (orig. No. 1187).

Similar to *M. a. asiatica* but averaging decidedly larger, and coloration paler and grayer, the foreneck and chest light drab to hair brown instead of fawn color, the back, etc., hair brown to deep drab. Measurements of type.—Wing, 166.5; tail, 112; culmen, 23; tarsus, 25; middle toe, 27 mm.

Leptotila verreauxi nuttingi subsp. nov.

Type, adult ♂, U. S. Nat. Mus., No. 91,130, Ometepe, Nicaragua, March 7, 1883. Collected by C. C. Nutting.

Similar to *L. v. verreauxi* but with much less of vinaceous-russet (or cacao brown) on inner webs of remiges, this color forming merely a broad edging, at the widest part not more than one-fourth the width of the web; upper parts browner (but much lighter brown than in *L. v. riottei*). Measurements of type.—Wing, 141; tail, 107; culmen, 15; tarsus, 30.5; middle toe, 24.5 mm.

Vol. XXVIII, pp. 109–114 May 27, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF A NEW GENUS AND SEVEN NEW RACES OF FLYING SQUIRRELS.

BY ARTHUR H. HOWELL.

A study of the American flying squirrels has led to the discovery of a number of unrecognized forms, preliminary descriptions of which are presented herewith. The subgenus *Glaucomys* Thomas,* is believed to be of generic rank and the name is therefore used for all the American species. The large Himalayan species, *Sciuroptcrus fimbriatus* Gray, referred by Thomas to *Glaucomys*, is here made the type of a new genus. *Sciuropterus* F. Cuvier, 1825, as has been shown by Miller,† is a synonym of *Pteromys* G. Cuvier, 1800‡; the latter name, in my opinion, should be restricted to the small Palaearctic species—*volans*,§ *büchneri*, and related forms.

Eoglaucomys genus nov.

Type, *Sciuroptera fimbriata* Gray (= *Sciuropterus fimbriatus* auct.).

Characters.—Skull essentially similar in general features to that of *Glaucomys;* postorbital processes longer and more strongly decurved; interparietal with antero-posterior diameter much greater than in *Glaucomys*—about two-thirds of the transverse diameter; molariform teeth much as in *Glaucomys*, with comparatively simple structure, *but with crown of* pm^3 *divided into two cusps by a distinct sulcus* (partially worn teeth

* Ann. & Mag. Nat. Hist., (ser. 8) I, 1908, p 5 (type *Mus volans* Linn.).

† Proc. Biol. Soc. Wash., XXVII, 1914, p. 216.

‡ *Pteromys* G. Cuvier, Leçons Anat. Comp., I, 1800—Type, *Sciurus volans* Linn. = *Pteromys russicus* auct.

§ Linnaeus (Syst. Nat. ed. 10, 1758) named the European flying squirrel *Sciurus volans* and the American species *Mus volans;* the names are not homonyms, therefore, and in recognizing the two animals as generically distinct, it will be necessary to use the name *Pteromys volans* (= *P. russicus* of Tiedemann and later authors) for the Russian animal, retaining *Glaucomys volans* for the small species of eastern North America.

showing two closed triangles). *Soles partially naked, bearing five pads*—four at the bases of the toes, and *a large metatarsal pad*, elliptical in shape, situated about midway between the heel and the base of the toes;* tail slightly flattened, full and bushy, narrowing decidedly towards the tip; ears large, subtriangular in shape, more acutely pointed than in either *Glaucomys* or *Pteromys*.

Remarks.—The genus, so far as known, is monotypic. In external appearance it bears no close resemblance either to the American *Glaucomys* or to the small Palaearctic flying squirrels of the genus *Pteromys*, being readily distinguished from either by the characters of the soles, as well as by large size and bushy, tapering tail. In cranial characters, the resemblance to *Glaucomys* is certainly striking, as Mr. Thomas has pointed out,† but in assigning the animal to the latter group, he evidently overlooked the important structural differences in the anterior premolar and in the plantar tubercles.

Glaucomys volans saturatus subsp. nov.

Type from Dothan, Alabama; adult female, No. 178,366, U. S. Nat. Mus. (Biological Survey collection); collected March 13, 1912, by A. H. Howell; original number 1960.

Characters.—Similar in size and skull characters to *volans*, but upperparts darker at all seasons; toes not conspicuously whitened in winter. Compared with *querceti:* Upperparts darker, face grayer (less buffy), hind feet grayer (less brownish), and audital bullae smaller.

Measurements.—Average of 12 adults from southern Alabama: Total length, 226; tail vertebrae, 100; hind foot, 30. Skull (of type): Greatest length, 34.9; zygomatic breadth, 20.4; mastoidal breadth, 17.4; interorbital breadth, 7.2; length of nasals, 9.5; alveolar length of maxillary tooth row, 6.5.

Remarks.—This dark race of *volans* occupies the Gulf States, excepting Florida and Texas (and perhaps Louisiana), extending north to eastern Tennessee and western North Carolina and west to Arkansas and Oklahoma. It differs in color from all the surrounding races and from *querceti* and *texensis* also in skull characters.

Glaucomys volans texensis subsp. nov.

Type from 7 miles northeast of Sour Lake, Texas. Adult male, No. 136,400, U. S. Nat. Mus. (Biological Survey collection); collected March 15, 1905, by J. H. Gaut; original number 3480.

Characters.—Similar in size and color to *volans;* upperparts slightly more ochraceous and toes without conspicuous white markings in winter; skull decidedly shorter and relatively broader. Compared with *saturatus:* Colors much paler; skull shorter and broader. Compared with *querceti:* similar in color, but skull shorter, with smaller audital bullae.

* A small, circular, supplementary tubercle appears in some specimens on the outer side of the sole, directly posterior to the pad at the base of the fifth digit.

† Ann. & Mag. Nat. Hist. (Ser. 8), I, 1908, p. 6.

Measurements.—Average of six adults from type locality: Total length, 229; tail vertebrae, 104; hind foot, 30.8. *Skull* (of type): Greatest length, 34; zygomatic breadth, 20.9; mastoidal breadth, 17.2; interorbital breadth, 7.3; length of nasals, 9.2; alveolar length of maxillary toothrow, 6.3.

Remarks.—This subspecies bears a close resemblance to both *volans* and *querceti* in color but differs from them in characters of the skull. It is known from only a few localities, but apparently occupies the humid portion of eastern Texas and portions of Louisiana.

Glaucomys sabrinus canescens subsp. nov.

Type from Portage la Prairie, Manitoba. Subadult female, No. 7663, Field Mus. of Nat. Hist.; collected February 3, 1900, by G. F. Dippie.

Characters.—Similar to *G. s. macrotis*, but much paler, with grayer head and larger skull. Compared with *sabrinus:* Size smaller; upperparts and feet paler; underparts whiter.

Measurements.—Average of two specimens from type locality: Total length, 298; tail vertebrae, 140; hind foot, 38. *Skull* (of type): Greatest length, 38.8; zygomatic breadth, 22.9; mastoidal breadth, 17.6; interorbital breadth, 7.6; length of nasals, 11.2; alveolar length of maxillary toothrow, 7.6.

Remarks.—This is the palest of the races of *sabrinus* and is apparently intermediate in size between *sabrinus* and *macrotis*. By reason of the small number of specimens available, its range can not be defined with exactness, but probably it occupies the thinly timbered portions of southern Manitoba and eastern North Dakota and may range even farther westward.

Glaucomys sabrinus columbiensis subsp. nov.

Type from Okanagan, British Columbia. Subadult male, No. 94,310, U. S. Nat. Mus. (Biological Survey collection); collected May 9, 1898, by Allan Brooks; original number 1214.

Characters.—Similar to *G. s. klamathensis*, but upperparts more vinaceous and tail much darker; much paler than *oregonensis*, both above and below; very similar to *sabrinus*, both in color and cranial characters, but soles of hind feet often yellow (as in *klamathensis*); skull similar to that of *oregonensis;* smaller than that of *klamathensis*, with smaller bullae.

Measurements.—Two specimens (subadult) from Okanagan Lake, B. C., each measured: Total length, 313; tail vertebrae, 143; hind foot, 42. *Skull:* Average of 4 (adult and subadult) from same locality: Greatest length, 41; zygomatic breadth, 24.4; mastoidal breadth, 19.1; interorbital breadth, 7.3; length of nasals, 12.7; alveolar length of maxillary toothrow, 7.8.

Remarks.—This subspecies is most closely related to *oregonensis* of the coast region of Oregon and Washington, intermediates between the two forms occurring at Sumas and Chilliwack, B. C. Intergradation with *fuliginosus*—the form occupying the Cascades—is shown by specimens from mouth of Salmon River, B. C. The present form occupies the low country in the interior of British Columbia and northern Washington.

Glaucomys sabrinus latipes subsp. nov.

Type from Glacier, British Columbia. Adult female, No. 68,753, U. S. Nat. Mus. (Biological Survey collection); collected August 13, 1894, by J. Alden Loring; original number 2111.

Characters.—Similar to *G. s. fuliginosus*, but larger, and upperparts averaging darker and grayer; feet larger and darker colored. Compared with *alpinus:* Size larger; colors darker (more brownish, less drab); underparts darker.

Measurements.—Adult female (type): Total length, 359; tail vertebrae, 161; hind foot, 43; average of 9 adults from Coolin, Idaho, and Stanton Lake, Mont.: 339, 151; 40.6. *Skull* (of type): Greatest length, 44.2; zygomatic breadth, 25.1; mastoidal breadth, 20; interorbital breadth, 8.3; length of nasals, 14; alveolar length of maxillary toothrow, 8.8.

Remarks.—This subspecies is one of the largest of the American flying squirrels, equaling *yukonensis* in external measurements and exceeding it in size of skull. Although evidently closely related to *fuliginosus*, of the Cascades, there is at present no evidence of intergradation with that race. The present form differs widely from *alpinus*, which occupies the eastern slopes of the Rockies in Alberta, and from the much smaller *bangsi* of the Bitterroot and Sawtooth Ranges of Idaho and Montana.

Glaucomys sabrinus flaviventris subsp. nov.

Type from head of Bear Creek, Trinity County, California (altitude 6400 feet). Adult male, No. 13,319, Univ. of Calif., Mus. Vert. Zool.; collected August 13, 1911, by Annie M. Alexander; original number 1775.

Characters.—Similar in size and skull characters to *G. s. lascivus*, but underparts and feet strongly suffused with yellow or buff; similar to *klamathensis*, but smaller, with much smaller audital bullae; underparts more yellowish and tail darker beneath. Compared with *stephensi:* Upperparts much paler and underparts more yellowish; skull flatter with shallower braincase.

Measurements.—Average of five adults from type locality: Total length, 301; tail vertebrae, 133; hind foot, 40.4; ear, 20.7. *Skull* (of type): Greatest length, 40; zygomatic breadth, 23.4; mastoidal breadth, 17.9; interorbital breadth, 7.9; length of nasals, 12.3; alveolar length of maxillary toothrow, 8.1.

Remarks.—This race is apparently most nearly related to *lascivus* of the Sierra Nevada, from which it differs widely in the color of the under-

parts. It intergrades with *lascivus* in the region around Mt. Lassen, with *klamathensis* in the Warner Mountains, and with *fuliginosus* in the Siskiyou Mountains.

Glaucomys bullatus sp. nov.

Type from Sawtooth (Alturas) Lake, Idaho. Adult female, No. $\frac{24271}{31675}$, U. S. Nat. Mus. (Biological Survey collection); collected September 28, 1890, by Vernon Bailey and B. H. Dutcher; original number 1883.

Characters.—Size large (about equaling *G. sabrinus latipes;* much larger than *G. s. bangsi*); color of upperparts similar to that of *bangsi* but decidedly more ochraceous (less vinaceous); gray on face purer and more extensive; skull large, with narrow, deep braincase, the fronto-parietal region markedly elevated; molars heavy; audital bullae very large.

Measurements.—Adult female (type): Total length, 340; tail vertebrae, 150; hind foot, 46; average of 6 adults from Ketchum, Idaho: 336; 142; 42.5. *Skull* (of type): Greatest length, 44; zygomatic breadth, 25; mastoidal breadth, 19; interorbital breadth, 8.7; length of nasals, 13.9; alveolar length of maxillary toothrow, 9.2.

Remarks.—This species resembles certain of the forms of *sabrinus* rather closely in color but is readily separated from all of them by its peculiar skull with very large bullae. Its range, as now known, is from Ketchum, Idaho, north to Cranbrook, British Columbia. At Sawtooth Lake it occurs on the same ground with the much smaller *G. s. bangsi* and at Cranbrook, B. C., occurs with *G. s. columbiensis.*

Vol. XXVIII, pp. 115–116 May 27, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SQUIRREL FROM NORTHEASTERN CHINA.

BY GERRIT S. MILLER, Jr.

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During February, 1915, Mr. Arthur de C. Sowerby visited the recently opened hunting reserve in a well wooded region about sixty miles northeast of Peking. Here he took five specimens of a squirrel of the genus *Tamiops*, no member of which has hitherto been known to occur in northeastern China. The animals, he writes, are almost entirely arboreal in habits, living in holes in the oak trees. They are very active, taking enormous leaps from one tree to another. The species is readily distinguishable from those previously described.

Tamiops vestitus sp. nov.

Type—Adult male, with moderately worn teeth (skin and skull), No. 199,561, United States National Museum. Collected by Arthur de C. Sowerby at Hsin-lung-shan, south of Jehol and 65 miles northeast of Peking, China, February 15, 1915. Original number 754.

Diagnosis.—Size maximum for the genus; fur dense and soft, its quality suggesting that of a flying squirrel; general color pale and grayish; a broad median blackish stripe and two broad pale lateral stripes, all becoming abruptly indistinct at shoulder, but fading away gradually to root of tail.

Color.—Sides of body below outer pale stripe a light gray between drab-gray and pale-drab-gray of Ridgway, passing into dull pale-pinkish-buff on underparts and cheeks, and into a distinctly brighter buff on crown, neck and shoulders, this area slightly clouded by blackish hair-tips; crown somewhat more brownish and reddish than neck, approaching a rich tawny-olive; ear buffy on inner side, blackish along rim, buffy white on outer surface (the whitish hairs elongated to form noticeable tuft); median dorsal stripe blackish, about 7 mm. wide at middle, ending abruptly at shoulder but fading and narrowing gradually to base of tail; first lateral pale stripe essentially concolor with buff of neck, but without

the dark clouding; second pale stripe essentially concolor with buffy white of ear; region between pale stripes slightly darker and more brownish than sides of body; feet light buff or buffy white, about concolor with inner pale dorsal stripe; hairs of tail brownish buff, those at sides and on upper surface with black subterminal band (about 4 mm.) and buffy white tip, the under surface about concolor with crown though less tinged with red; hairs at tip of tail black to extremities, but not forming a dark pencil.

Measurements.—Type, head and body, 123; tail, 88; hind foot, 31; ear, 16; condylobasal length of skull, 32.0; zygomatic breadth, 21.8; interorbital constriction, 12.2; breadth of braincase, 17.2; depth of braincase, 12.8; nasal, 10.4; diastema, 7.8; mandible, 21.0; maxillary toothrow (alveoli) 6.2; mandibular toothrow, 6.2.

Remarks.—Its full, soft fur and pale colors at once distinguish the boreal *Tamiops vestitus* from the austral members of the genus. In general type of markings it agrees with *T. hainanus* (Allen), and so far as can be judged from the descriptions, with *T. maritimus* (Bonhote) and *T. monticolus* (Bonhote).

Vol. XXVIII, pp. 117–120 May 27, 1915

PROCEEDINGS

OF THE

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NEW SPECIES OF DECAPOD CRUSTACEANS FROM THE DUTCH WEST INDIES.

BY MARY J. RATHBUN.

Some time ago I prepared an account of the stalk-eyed crustaceans collected by Dr. J. Boeke in 1905 in the Dutch West Indies. As the publication of that report has been unavoidably delayed, Doctor Boeke has given me permission to publish separately descriptions of the new species. The type specimens are in the Leiden Museum.

Family PENEIDÆ.

Metapenæus mobilispinis sp. nov.

Type.—Male, from Cave Round Bay, Saba, in about 4 fathoms, stony bottom; August 26.

Measurements.—Male, length from tip of rostrum to tip of telson 32.4 mm., length of carapace including rostrum 9.5 mm.

Description.—Carapace short-pubescent in front of cervical suture. Rostrum ascending, short, not reaching end of eyes; deep, lower limb as wide as upper, which is convex and armed with 5–7 curved teeth. Postrostral crest continued to middle of carapace and armed at anterior fourth of carapace and at posterior end of rostrum with a straight, slender spine. Antero-lateral angles of carapace rounded. Postocular tooth small, acute. Postantennular spine long and slender, postantennular groove deep, meeting the cervical groove. A very short, oblique and deeply impressed groove on either side of rostrum at anterior border of gastric region. Branchial region bordered anteriorly by a sinuous groove (part of the cervical groove), and superiorly by a groove which is very deep below the hepatic spine but becomes faint posteriorly and disappears altogether towards the hind region of the carapace.

Fifth and sixth abdominal terga sharply carinated at middle; fifth segment a little more than half as long as sixth, which is a little longer than telson. Telson considerably shorter than inner caudal swimmeret and has two slender marginal spines (the posterior the longer) on either side

near the middle; extremity cut into three slender spines, middle one longest, widening at its middle, lateral ones very slender, with an articulating extremity.

Eyes very large, not reaching end of antennular scale. Outer or upper antennular flagellum shorter than inner which is shorter than peduncle. Third maxillipeds reach to middle of last article of antennal peduncle; dactylus suboval. Terminal joints of fourth and fifth pairs of thoracic legs lanceolate; fifth pair extend to end of first third of antennal scale.

The andricum increases in width distally, is much thickened at the middle, very thin in terminal third where it forms three lobes on each side, the distal one round, the next half as wide, the proximal one filiform.

Relationships.—*M. goodei* (Smith) of the West Indian region and *M. pubescens* (Stimpson) from St. Thomas, which may be identical, both have a longer rostrum than our species, a spine at antero-inferior angle of carapace and the abdominal carina begins on the second segment.

Family XANTHIDÆ.

Panopeus boekei sp. nov.

Type.—Male, from Tumble-Down-Dick Bay, St. Eustatius, 15 fathoms, stony bottom; September 17.

Measurements.—Male, length 8.6 mm., width 13 mm., fronto-orbital width 9.4 mm., front 4.4 mm.

Description.—Carapace deeply areolated in anterior two-thirds, areoles crossed by granulated rugæ; surface finely granulated and covered with scattered hairs of uneven length; carapace convex in a longitudinal as well as in a transverse direction, save for the four antero-lateral teeth which are thickened and upturned; teeth well separated; first tooth short and broad, convex; second tooth more prominent and equally wide, posterior margin convex, anterior straight or slightly concave, tip blunt; third tooth similar in shape, but longer, narrower and thicker; fourth tooth narrow, triangular, acute, situated at widest part of carapace. Front with a deep, narrow, median emargination, forming a rounded lobe on each side, at the outer end of which there is a very small rounded lobe. Across the front runs a transverse raised line fringed with long hair. Preorbital angle prominent, blunt; lobe between the two upper fissures of the orbit nearly transverse, slightly convex; lower margin with a blunt inner tooth; a V-shaped notch below outer angle.

Larger cheliped much more massive than smaller. Merus short and high, with a groove subparallel to distal margin and behind it a flattened tooth on upper margin; carpus rugose, with a distal furrow and a small inner tooth; manus granulate, granules reticulating, upper surface with a shallow groove; fingers with rows of punctæ, a groove on outside and inside of immovable finger, and a groove near upper edge of outer surface of dactylus; prehensile edges irregularly toothed, one of the larger teeth at base of dactyl of larger chela; fingers in this chela gaping moderately;

larger thumb slightly deflexed, smaller one considerably so ; fingers light brown, color not extended on palm.

Ambulatory legs hairy, slender and rather long, second one longer than carapace is wide.

Surface of maxillipeds and sternum finely granulate. Abdomen of male reaching to coxæ of last legs; third, fourth and fifth segments coalesced, although short depressions indicate suture lines ; sixth segment about twice as wide as long, widening distally, seventh segment broadly triangular.

Relationships.—This species in its areolation and prominent lateral teeth resembles *P. bermudensis* Benedict and Rathbun* in which the first lateral tooth is larger and the last tooth smaller: the lobes of the front are not so rounded nor so deeply separated ; tooth larger at base of dactylus of large chela ; male abdomen with fused segment wider at base, penultimate and last segments longer.

* Proc. U. S. Nat. Mus., vol. 14, 1891, p. 376, pl. 20, fig. 2, pl. 24, figs. 14, 15.

Vol. XXVIII, pp. 121–124 May 27, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW TURNAGRA FROM STEPHENS' ISLAND, NEW ZEALAND.

BY J. H. FLEMING.

The *Turnagra* from Stephens' Island, New Zealand, appears to differ subspecifically from the South Island Thrush and may be known as

Turnagra capensis minor subsp. nov.

Like *Turnagra capensis capensis*, but smaller; back brownish olive, not raw umber as in *capensis;* concealed bases of the feathers of the back lighter.

Sparrman's name *capensis* has been revived, and I think rightly, by Mathews and Iredale,* who fix the type locality at Dusky Sound,† South Island. The type of *Tanagra capensis* figured by Sparrman‡ is a young bird similar to the last three birds in my table of measurements. Gmelin's *Turdus crassirostris*§ is based on a male and female "Thick-billed Thrush" described by Latham;‖ one of the types, the male, is still at Vienna;¶ and Dr. Sharpe's statement that the type is in the British Museum** is erroneous. He probably had in mind Forster's drawing, plate 145, in the museum library, which is marked "Dusky Bay, Queen Charlotte's Sound, April 4, 1773."†† Sparrman was Forster's assistant on Cook's Second Voyage, and Latham described birds then in the Leverian Museum from Cook's Voyage, it is therefore probable that the types are of the same origin if not the same birds.

The type of *Tanagra macularia* of Quoy and Gaimard‡‡ was taken, the authors state,§§ on the South Island in the thick woods of the heights of

* Ibis, 1913, p. 445.
† Ibis, 1913, p. 202.
‡ Mus. Carlson., 1787, pl. XLV.
§ Syst. Nat. I, p. 815, 1789.
‖ Gen. Synop. II, pt. I, p. 34, pl. XXXVII, 1783.
¶ Ibis, 1873, p. 26.
** Hist. of the Collections in the British Museum, Birds, p. 492, 1906.
†† Hist. of the Collections in the British Museum, Birds, p. 194, 1906.
‡‡ Voy. de l'Astrol., Zool. I, 1830, p. 186, pl. 7, fig. 1.
§§ Voy. de l'Astrol., Zool. I, 1830, p. 187.

the French Pass. They do not appear to have landed on D'Urville Island, and the nearest anchorage of the "Astrolabe" in Tasman's Bay was Croiselles Harbor. D'Urville Island thus separates the type locality of *maculata* from *minor*.

Stephens' Island is in Cook's Strait and is thus described by Buller: "Lying two miles to the north-eastward of the northern extremity of D'Urville Island, and rising abruptly from the sea to a height of a thousand feet, is Stephens' Island, only about a square mile in extent, and more or less wooded on its sides."* Stephens' Island is known to ornithologists as the place where *Traversia lyalli* was found and exterminated. Buller gives the following measurements in inches of eggs in the Nelson Museum: South Island, 1.3 x 1.05 † and 1.6 x .95; Stephens' Island, 1.25 x .75.‡

Notes on the plumage of *Turnagra capensis capensis*.

I have examined for the purposes of this paper, twenty-three skins of *Turnagra*, seven in the British Museum, five in the Carnegie Museum,§ three in the U. S. National Museum, and eight in my own collection; of these only eleven have localities on the labels, and the sex marks are, of course, unreliable, but enough material has been compared to separate the ages, which does not appear to have been done clearly before.

Adults.—Large birds, distinguished by sooty black upper and lower mandibles (in dried skins), tarsus not quite so dark, back raw umber becoming brighter on the rump. The breast feathers are dark citrine, with large white centres, producing a regularly streaked effect; the middle and greater coverts only slightly edged with chestnut, which is absent in more worn plumage.

Immature.—Upper mandible lighter than in the adult, lower mandible Brussels brown, the tarsus raw umber in dried skins; back sepia, in adults and immature birds a gray cast appears in worn plumage on the head and hind neck but does not reach the back; breast feathers pale olive buff in the centres, chestnut edgings of the greater and lesser coverts greatly increased. This is the plumage figured by Buller,‖ who gives the irides as yellow.

Young.—Smaller birds, distinguished by beak and tarsus being wholly Brussels brown in dried skins, breast lighter owing to the grayer edgings to the feathers, many of the throat and neck feathers tipped or edged with chestnut, exposed parts of the greater and lesser coverts chestnut, producing a solid chestnut patch on the wing. A skin from the Jardine Collection is marked "Irides gray."

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* Ibis, 1895, p. 236.

† Birds of New Zealand, 2d ed., 1888, p. 32.

‡ Birds of New Zealand, Suppl. 1905, p. 136.

§ I have compared these with my series through the kindness of Mr. W. E. Clyde Todd.

‖ Birds of New Zealand, 2d ed., 1888, pl. V.

TABLE OF MEASUREMENTS (in millimeters).

Collection.	Sex from labels.	*Turnagra capensis minor.*	Wing.	Tail.	Tarsus.	Culmen.
Carnegie Mus. 24,753	♂ ad.	Stephens' Island, N. Z. 1894	114.	108.	32.	19.
Fleming Coll. *3915	♂ ad.	Stephens' Island,	114.	104.	33.	18.
Brit. Mus. 1903. 12. 10. 2	♀ ad.	" " N. Z.	114.	102.	32.	18.
Carnegie Mus. 24,754	♀ ad.	" " 1895	108.	98.	32.	17.5
Turnagra capensis capensis.						
Brit. Mus. 1903. 7. 17. 18	♂ ad.	Dusky Bay, N. Z., June, 1901	126.	118.	36.	19.
U. S. Nat. Mus. 148,738	♂ im.	†Tiapo, N. Z., Sept., 1873	126.	116.	38.	19.
U. S. Nat. Mus. 192,508	♀ ad.	Secretary Island, N. Z., Jan. 17, 1899	126.	§127.	37.	19.
U. S. Nat. Mus. 192,507	♂ ad.	Secretary Island, N. Z., Jan. 12, 1899	125.	115.	39.	19.?
Carnegie Mus. 24,752	♂ ad.	‡Lake McKerrow, N. Z., Sept. ?, 1894	124.	121.	33.	21.
Carnegie Mus. 24,755	♀ ad.	Otago, N. Z., 1895	124.	119.	32.	18.5
Fleming Coll. 12,267	♀ ad.	†Tiapo, N. Z., Sept., 1873	120.	111.	34.	19.
Brit. Mus. 49. 12. 12. 23	♂ juv.	—? N. Z.	119.	105.	32.	16.
Brit. Mus. 49. 12. 12. 24	♀ juv.	—? N. Z.	117.	110.	32.	16.
Brit. Mus. 86. 6. 24. 22	? juv.	—? N. Z.	114.	107.	32.	17.

Collectors.—The Carnegie Museum birds are from Sir Walter Buller's last collection, but they were not collected by him; the Stephens' Island birds were perhaps collected by Dannefærd in 1903—2 certainly was; 1903—18 was collected by the Earl of Ranfurley; the Secretary Island birds by Mr. H. H. Travers; 86—22 is from the Jardine Coll.; 49—23 and 24 were collected by Dr. Lyall.

* Type.

† Probably Taipo in N. E. of Westland Prov.; the labels are those of Sir J. Van Haast.

‡ In Lake Co.

§ This is the longest tail measurement in a series of twenty-three.

Vol. XXVIII, pp. 125–126 May 27, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW SUBSPECIES OF BIRDS FROM EASTERN MEXICO AND YUCATAN.

BY OUTRAM BANGS.

Of the three birds here provided with new names one is a well-marked subspecies of *Tityra semifasciata*, inhabiting Yucatan, characters for which have already been indicated by Ridgway. Another is the resident form of the American Robin of Southern Mexico, the peculiarities of which have been noticed by both Ridgway and Phillips. The third is a strongly characterized northeastern form of the little blue grosbeak of Mexico—*Cyanocompsa parellina*.

Tityra semifasciata deses subsp. nov.

Type from Chichen Itza, Yucatan. No. 40,079, Museum of Comparative Zoology, adult ♂. Collected February 26, 1904, by L. J. Cole.

Characters.—Similar to *T. semifasciata personata* (J. & S.) but smaller and paler. Adult ♂ with gray of upper parts paler, and with the under parts white, less grayish. Adult ♀ with the color of upper parts pale, more uniform and decidedly more brownish.

Measurements.—In four adult ♂ topotypes, wing, 125.5 to 127.5; tail, 73 to 75; tarsus, 24 to 26; exposed culmen, 23 to 24. In three adult ♀ topotypes, wing, 121 to 124; tail, 70.5 to 72; tarsus, 25.5 to 28; exposed culmen, 24–25.5.

Turdus migratorius phillipsi* subsp. nov.

Type from Las Viegas, Vera Cruz, Mexico, adult ♀, No. 2130. Bangs Coll. in Mus. Comp. Zoöl. Collected April 20, 1897, by C. B. Isham.

Characters.—Similar in color and markings to *T. migratorius propinquus* Ridg., but decidedly smaller with relatively larger bill. *Type*, adult ♀. Wing, 126; tail feathers, 86; tarsus, 33; exposed culmen, 19. For further measurements and remarks, see Ridgway, Birds of North and

* Named for my colleague, Dr. John C. Phillips.

Middle America, Part IV, p. 101, and Phillips, A Year's Collecting in the State of Tamaulipas, Mexico, The Auk, Vol. XXVIII, p. 80.

Remarks.—All specimens from Central and Northwestern Mexico should, I think, be referred to *T. migratorius propinquus*, those from northern Tamaulipas are more or less intermediate, while all from southern Tamaulipas and the mountains of Vera Cruz belong to the new form.

I use the generic name *Turdus*, not because I consider the American Robin more nearly related to the spotted thrushes than to the members of the so-called genus *Planesticus*, but because I agree with most European ornithologists in failing utterly to understand why such intimately related forms should be separated generically.

Cyanocompsa parellina beneplacita subsp. nov.

Type from Santa Leonor, Tamaulipas, Mexico. Adult ♂, No. 49,685, Coll. Mus. Comp. Zoöl. Collected April 5, 1909, by F. B. Armstrong.

Characters.—At once distinguished from all the other subspecies by having a *much* shorter, narrower, more fringilline bill, which in the ♂ is wholly black, in the ♀ dusky horn color; the mandible scarcely paler.

Adult ♂ duller and grayer blue than the adult ♂ of *C. parellina parellina* (Bp.) of Vera Cruz to Yucatan, some examples nearly as pale as *C. parellina indigotica* Ridg. of western Mexico (as a whole the series is about intermediate in color between these two forms). Adult ♀, much paler and grayer brown, both above and below than the ♀ of *C. p. parellina*, not very different in color from the ♀ of *C. p. indigotica*. Size, except bill, about as in *C. p. parellina*, smaller than in *C. p. indigotica*.

Measurements.—*Type*, adult ♂. Wing, 68; tail, 55; tarsus, 19.5; culmen from base, 10.5; width of mandible at base, 7. Adult ♀ *topotype* No. 49,682, wing, 66; tail, 52; tarsus, 18.5; culmen from base, 10; width of mandible at base, 6.5. Extreme measurements afforded by ten other males are—wing, 67–70.5; tail, 52.5–57; tarsus, 17–19.5; culmen from base, 10–11; width of mandible at base, 6.5–7.5; by three other females —wing, 64–65; tail, 50–52; tarsus, 18–19; culmen from base, 10–10.5; width of mandible at base, 6.5–7.

Remarks.—While collecting for Doctor Phillips in Tamaulipas, F. B. Armstrong secured twenty-six specimens of this well-marked form. All from the hill country in the west central part of the state are typical. Several skins, however, from Altamira in the southeastern corner of Tamaulipas are decidedly intermediate in all characters, and might almost as well be referred to *C. p. parellina* as to the new form.

It is possible a still further subdivision should be made and the Yucatan form be given a name. It is similar to the Vera Cruz bird in size and in size, shape and color of the bill, but three out of our four adult males are very bright blue below, much more brilliant than in any Vera Cruz skin; the fourth specimen, however, is not different from Vera Cruz examples.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FIVE NEW RICE RATS OF THE GENUS ORYZOMYS FROM MIDDLE AMERICA.

BY E. A. GOLDMAN.

The following descriptions of new species and subspecies of *Oryzomys* are published in the course of a revision of the North and Middle American forms of the genus now in progress. These represent widely differing groups, three forms being from Mexico, one from Panama, and one from Costa Rica included with other material from that country kindly loaned by Dr. J. A. Allen, Curator of Mammalogy, American Museum of Natural History.

Oryzomys guerrerensis sp. nov.

Type from Omilteme, Guerrero, Mexico. No. 127,517, male adult (molars moderately worn), U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, May 20, 1903. Original number 16,454.

General characters.—A small species similar in general to *O. melanotis*, but decidedly smaller; color darker; ears wholly black [inner sides clothed with rusty reddish hairs in *melanotis*]; skull with very low, flat braincase.

Color.—Type (fresh pelage): Upperparts ochraceous-tawny (Ridgway, 1912), purest on cheeks, shoulders and sides, the face, top of head, and back darkened by a moderate admixture of black hairs; underparts dull grayish white, the plumbeous basal color of the fur showing through; outer and inner sides of ears well clothed with deep, glossy black hairs; feet whitish, the claws of longer toes overlapped by tufts of silvery bristles; tail brownish above, irregularly flesh color below to near tip, which is dusky all around.

Skull.—Similar in general to that of *O. melanotis*, but much smaller and lighter, with more slender zygomata; braincase similarly broad, but very much lower and flatter; outer wall of antorbital foramen with anterior border more rounded and less noticeably projecting forward as viewed from above; interparietal smaller; anterior palatine foramina about as broad anteriorly as posteriorly [broader posteriorly in *melanotis*]; teeth as in *melanotis*, but smaller.

Measurements.—Type: Total length, 220; tail vertebræ, 118; hind foot, 27. *Skull* (type): Greatest length, 26.3; zygomatic breadth, 14; interorbital breadth, 4.9; length of nasals, 10.1; length of anterior palatine foramina, 4; length of palatal bridge, 5.5; length of upper molar series, 3.8.

Remarks.—Six specimens from the type locality represent a form apparently allied to *O. melanotis*, of Jalisco, but specifically distinct. The wholly black ears and remarkably flat skull are distinguishing characters.

Oryzomys nitidus alleni subsp. nov.

Type from Tuís (about 35 miles east of Cartago), Costa Rica. No. $\frac{9631}{7971}$, young adult male (teeth slightly worn), American Museum of Natural History, collected by George K. Cherrie, July 15, 1894.

General characters.—In external appearance closely resembling *Oryzomys nitidus nitidus*, the pelage long and very soft as in that form (hairs on back about 12 millimeters in length); skull with higher, much more fully expanded braincase.

Color.—Type: Upperparts between ochraceous-tawny and cinnamon-brown, purest on cheeks, shoulders and sides; the face, top of head, and back heavily mixed with black, the very dark basal color of the fur showing through and producing a blackish effect; underparts dull whitish; ears black, thinly clothed with very short inconspicuous hairs; feet flesh color; tail nearly unicolor, dark brownish above, slightly paler below.

Skull.—Similar in general to that of *O. n. nitidus*, but braincase much more distended; interorbital constriction about the same, but supraorbital ridges more strongly divergent and frontal region decidedly broader posteriorly; dentition about the same.

Measurements.—Type: Total length, 218; tail vertebræ, 111; hind foot, 29. *Skull* (type): Greatest length, 28.2; zygomatic breadth, 14.3; interorbital breadth, 5.5; length of nasals, 10.9; length of anterior palatine foramina, 3.5; length of palatal bridge, 5.5; length of upper molar series, 4.3.

Remarks.—Specimens from San Javier and Carondelet, northern Ecuador, some of which have been identified by Mr. Oldfield Thomas with the Peruvian form described as '*Hesperomys laticeps* var *nitidus*' have been used for comparison. The Costa Rican animal agrees with these in many essential respects; it differs most noticeably in the expansion of the braincase, the swelling extending forward between the orbits and resulting in a greater lateral development of the frontals.

The new form is named for Dr. J. A. Allen, of the American Museum of Natural History, to whom I am indebted for many courtesies.

Specimens examined.—Three, from the type locality.

Oryzomys alfaroi dariensis subsp. nov.

Type from Cana, eastern Panama (altitude 2,000 feet). No. 178,660, female adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, March 4, 1912. Original number 21,453.

General characters.—A small form closely allied to *Oryzomys alfaroi alfaroi;* color of upper parts richer, more rufescent; skull usually narrower. Similar to *O. gracilis* and to *O. alfaroi palmiræ*, but color more rufescent and skull differing in detail.

Color.—Type: General color of upperparts near ochraceous-tawny, purest on cheeks shoulders and sides, the top of head and back suffused with tawny, finely mixed with black; underparts dull white; ears black; feet white, the four longer toes of hind feet with tufts of silvery bristles projecting beyond the claws.

Skull.—Small and slender in form, the anterior palatine foramina broad, but much shorter than palatal bridge; audital bullæ small. About like that of *O. a. alfaroi*, but braincase and frontal region usually narrower. Closely resembling that of *O. a. palmiræ*, but shorter, with more widely spreading zygomata and smaller teeth.

Measurements.—Type: Total length, 203; tail vertebræ, 107; hind foot, 25.5. Average of five adult topotypes: 220 (212–226); 113 (107–117); 24.6 (23–26). *Skull* (type): Greatest length, 27.4; zygomatic breadth, 14.5; interorbital breadth, 5; length of nasals, 11.1; length of anterior palatine foramina, 3.7; length of palatal bridge, 5.5; length of upper molar series, 3.7.

Remarks.—This small, slender rice rat differs from typical *O. a. alfaroi*, of Costa Rica, mainly in richer, more tawny coloration. It is closely allied to the Colombian form described as *O. palmiræ* and the latter is clearly assignable to subspecific rank, if it does not prove to be identical with *O. gracilis*, the type of which came from farther north in the Cauca Valley. Comparison of *O. a. dariensis* with specimens from northern Ecuador, assigned to *O. gracilis* by Mr. Oldfield Thomas, and reference to the original description of that species indicate that the two are very nearly related. The description of the color of *O. gracilis*, however, seems to apply to the Ecuadorean specimens, or to *O. palmiræ*, rather than to the Darien animal. Moreover, the skull of the new form is distinguished from that of *O. gracilis*, as here understood, by the greater lateral expansion of the zygomata.

Specimens examined.—Ten, all from the type locality.

Oryzomys couesi regillus subsp. nov.

Type from Los Reyes, Michoacan, Mexico. No. 125,945, male adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, February 17, 1903. Original number 15,962.

General characters.—A large richly colored form of the *O. couesi* group, with long, soft pelage. Similar in general to *O. c. couesi* but much larger and paler colored, the underparts usually white instead of buffy. Size and proportions about as in *O. albiventer*, but upperparts darker and more rufescent in color.

Color.—Type: Upperparts in general rich ochraceous-buff, the back and rump strongly suffused with tawny and lined with black hairs; under-

parts, including lips, dull whitish; outer sides of ears blackish, the inner sides clothed with buffy hairs; feet white; tail light brownish above, whitish or flesh color below on basal half, becoming brownish all around toward tip. In other examples the underparts vary from nearly pure white to light buff.

Skull.—In general form very similar to that of *O. c. couesi*, but much larger, with heavier dentition; anterior palatine foramina about equal to palatal bridge [usually longer than palatal bridge in *O. c. couesi*], and ending posteriorly near anterior plane of first molars; interparietal relatively smaller.

Measurements.—Type: Total length, 305; tail vertebræ 169; hind foot, 36. *Skull* (type): Greatest length, 33.4; zygomatic breadth, 18.3; interorbital breadth, 5.2; length of nasals, 12.5; length of anterior palatine foramina, 6.4; length of palatal bridge, 6.4; length of upper molar series, 4.9.

Remarks.—This handsome rice rat is a member of the widely dispersed *O. couesi* group. It is closely allied to *O. albiventer*, a near geographic neighbor, and examination of specimens from intermediate localities indicates gradation through intervening forms to typical *O. c. couesi*.

Specimens examined.—Ten, all from the type locality.

Oryzomys fulvescens lenis subsp. nov.

Type from Los Reyes, Michoacan, Mexico. No. 125,941, male adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, February 14, 1903. Original number 15,948.

General characters.—Similar to *Oryzomys fulvescens fulvescens* but upper parts paler ochraceous-buff, the general tone more yellowish; skull broader and more massive.

Color.—Type (fresh pelage): Upper parts in general pale ochraceous-buff, becoming warm buff on cheeks, shoulders and lower part of sides; the face, top of head and back moderately lined with dark hairs; under parts light buff, except chin and lips, which are white; outer sides of ears blackish, inner sides clothed with ochraceous buffy hairs; feet white; tail light brownish above, flesh color below proximally, becoming dusky all around toward tip.

Skull.—Broader than that of *O. f. fulvescens;* zygomata more widely spreading; maxillary arms of zygoma and ascending branches of premaxillæ broader and heavier; dentition rather heavy, but equalled in some examples of *O. f. fulvescens*.

Measurements.—Type: Total length, 198; tail vertebræ, 115; hind foot, 23. *Skull* (type): Greatest length, 22.6; zygomatic breadth, 12.3; interorbital breadth, 3.4; length of nasals, 8.6; length of anterior palatine foramina, 3.9; length of palatal bridge, 4.1; length of upper molar series, 3.

Remarks.—*Oryzomys f. lenis* is a pale form of *O. fulvescens* ranging at the lower elevations along the Pacific side of Mexico. Aside from paler coloration, it is distinguished from *O. f. fulvescens* by the broader, more massive skull.

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PROCEEDINGS

OF THE

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A NEW SPECIES OF TAILLESS BATRACHIAN FROM NORTH AMERICA.

BY LEONHARD STEJNEGER.

[Published by permission of the Secretary of the Smithsonian Institution.]

A very interesting addition to the fauna of the United States was found in a recent collection kindly presented to the National Museum by Mr. R. D. Camp. It is a small species of the Mexican genus *Syrrhophus*, already represented in Texas by the type species *Syrrhophus marnockii* Cope, the original specimens of which came from near San Antonio. These Leptodactylid toads differ from *Eleutherodactylus* and *Lithodytes* in the absence of vomerine teeth.

Syrrhophus campi new species.

Diagnosis.—Heel of extended hind leg reaches center of eye; diameter of tympanum slightly more that half that of eye; back coarsely granular; head wide.

Type.—U. S. Nat. Mus. Cat. No. 52,290; Brownsville, Texas; R. D. Camp, collector.

Description of type-specimen.—Tongue broadly pear-shaped, somewhat truncate behind with a tendency to a posterior lateral projection on each side; nostrils much nearer the tip of snout than the eye, their distance from the latter slightly less than the eye diameter and equal their distance from each other; upper eyelids much narrower than interorbital space which is wider than diameter of eye; tympanum distinct, circular, its rim interrupted above, slightly more than half the diameter of eye, distance from the eye one-third its own diameter; fingers with well-developed terminal disks which are truncate anteriorly; subarticular tubercles very strongly developed; palms strongly tuberculate; second finger scarcely longer than first; toes with considerably smaller disks; soles with small tubercles; both inner and outer metatarsal tubercles present and well developed; no tarsal fold; the bent limbs being pressed along the side, knee and elbow overlap; hind limb being extended along the side, heel reaches beyond posterior angle of eye; hind limbs being

placed vertically to the axis of the body, the heels overlap; skin above densely tubercular, except on snout and interorbital space which are nearly smooth; underside of body smooth, of femurs granular. Color (in alcohol) brownish gray above, with dark brown irregular markings which on the back join to form four ill-defined longitudinal bands; indication of a dark band across the interorbital space; ground color on top of snout anterior to this band and the outer space between the dorsal bands paler than elsewhere; a dark band from nostrils over lores, through eyes to above tympanum; sides with numerous small white spots; limbs with dusky cross bands and whitish spots on the light spaces; underside white, chin and throat minutely sprinkled with dusky.

Dimensions.—Tip of snout to vent, 24 millimeters; width of head, 8; nostrils to eye, 2.5; interorbital space, 3; diameter of eye, 2.75; diameter of tympanum, 1.5; fore leg from axilla, 14; hind leg from vent, 34; vent to heel, 19.

Coloration of living specimens.—Iris golden with black reticulations; ground color above olive clay, dark markings blackish; side of face dark with the loreal band blackish and whitish spots on upper lip and under eye; underside whitish, with more or less purplish tinge.

Variation.—The chief variation is found in the coloration of the alcoholic specimens, many of which are quite pale above with numerous small dusky spots without much indication of the pattern described in the type. A pale canthal stripe is often markedly set off from the dark loreal stripe, as is also a pale cross band in front of the interorbital black band. Younger specimens are often uniformly light brownish gray, and the very youngest, of which I have examined a number not measuring more than 7 mm. in total length, seem always to be without any dusky spots on back. All show more or less definite indications of cross markings on the legs. The skin above is equally tubercular in all the specimens, young as well as adult.

Remarks.—This species in many respects approaches *S. leprus* in general proportions and aspect (except coloration) but the head is somewhat narrower, the snout is longer and more pointed, the second finger is shorter and the foot longer. It differs from all the species described before by its coarsely granular upper surface.

This interesting novelty, according to information furnished by Mr. Camp, was "found under boxes and boards about buildings in city." A number of very young specimens, 7–8 mm. long, were collected with the adult ones. They show no trace of a tail and it is quite likely, as Dr. Thomas Barbour has suggested to me, that they are hatched fully developed from the egg, as we know to be the case with some of the species of *Eleutherodactylus*.

Vol. XXVIII, pp. 133–138 June 29, 1915

PROCEEDINGS

OF THE

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FIVE NEW MAMMALS FROM MEXICO AND ARIZONA.

BY E. A. GOLDMAN.

The following descriptions of hitherto unrecognized forms of mammals in the collection of the Biological Survey are based in part on material gathered by E. W. Nelson and myself, mainly in Mexico. One of the woodrats was included in a collection of mammals made by Charles Sheldon during a recent visit to the state of Sonora, Mexico.

Potos flavus guerrerensis subsp. nov.

GUERRERO KINKAJOU.

Type from near Ometepec, Guerrero, Mexico. No. 74,683, male adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson, and E. A. Goldman, February 15, 1895. Original number 7464.

General characters.—Size and color about as in *P. f. aztecus;* skull less elongated, the rostrum and frontal region relatively broad; audital bullæ more fully inflated, rounded and bulging conspicuously below basioccipital, instead of flattened as in all of its known relatives in Middle America.

Color.—Type: Upperparts near clay color (Ridgway, 1912), somewhat suffused with ochraceous-tawny, especially on neck, the top of head and back darkened by brownish-tipped hairs; underparts, including inner sides of limbs and under side of tail cinnamon-buffy, this color darkest across abdomen and becoming clay color along the sides; outer sides of limbs and feet to base of toes similar to back, the toes more brownish. Another specimen, an adult male, is richer, more ochraceous-tawny in color, with an elongated dark brown patch on the median line of the abdomen; also present in some specimens of other forms of the group.

Skull.—Similar to that of *P. f. aztecus*, but less elongated, the rostrum and frontal region relatively broad; basioccipital narrower and less distinctly ridged along median line; audital bullæ more inflated, projecting

more conspicuously below basioccipital; postorbital processes stout and tapering as in *aztecus*, not peg-like as in *P. f. chiriquensis*.

Measurements.—Type: Total length, 1050; tail vertebræ, 535; hind foot, 110. An adult male topotype: 950; 490; 103. *Skull* (type): Greatest length, 93.5; condylo-basal length, 89.1; zygomatic breadth, 61.9; interorbital breadth, 22.3; breadth of rostrum, 23.7; breadth across mastoid processes, 46.3; alveolar length of upper molariform toothrow, 21.

Remarks.—An arm of the general range of the *Potos flavus* group extends northward in the tropical belt along the Pacific coast west of the high mountains of the interior to Papayo (near Acapulco), Guerrero, and perhaps farther. Specimens from this region do not differ appreciably in general size or color from *P. f. aztecus* of eastern Mexico, but the cranial characters are distinctive.

Specimens examined.—Four, from localities in Guerrero as follows: Near Ometepec (type locality), 3; Papayo, 1.

Geomys personatus tropicalis subsp. nov.

TAMAULIPAS POCKET GOPHER.

Type from Alta Mira, Tamaulipas, Mexico. No. 92,946, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, April 18, 1898. Original number 12,320.

General characters.—Similar in color to *G. p. personatus* and *G. p. fallax;* size rather small, about as in *fallax*, much smaller than in typical *personatus;* skull differing in detail from both, especially in the anteriorly spreading zygomata, slenderer posterior ends of premaxillæ, and narrower interpterygoid fossa.

Color.—Type (somewhat worn pelage): General color of upperparts between cinnamon and cinnamon-buff, fading to light buff along lower part of sides; the top of head and back thinly overlaid with brown; underparts white; feet thinly clothed with short whitish hairs; tail nearly naked; flesh-colored.

Skull.—Similar in size to that of *G. p. fallax*, much smaller than that of *G. p. personatus;* zygomata narrowing posteriorly, the sides less nearly parallel, and ascending branches of premaxillæ narrower, more tapering posteriorly than in *fallax* or typical *personatus;* interpterygoid fossa narrow; mastoid and audital bullæ shrunken in appearance much as in typical *personatus*, not swollen or rounded as in *fallax*.

Measurements.—Type: Total length, 270; tail vertebræ, 86; hind foot, 33. *Skull* (type): Condylo-basal length, 46.9; zygomatic breadth, 30.4; interorbital breadth, 6.2; length of nasals, 17.6; alveolar length of upper molar series, 10.

Remarks.—No specimens of the genus *Geomys*, as now restricted, have hitherto been recorded from Mexico. The discovery of a form of *G. personatus* in extreme southern Tamaulipas, therefore, materially extends the known range of the group to the southward.

Specimens examined.—Twelve, all from the type locality.

Neotoma albigula mearnsi subsp. nov.

MEARNS WOOD RAT.

Type from Tinajas Altas, near international boundary, southwestern Arizona. No. 202,981, male adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, November 21, 1913. Original number 22,300.

General characters.—Closely allied to *N. a. albigula* but paler, the ground color of upperparts light buff instead of warm buff or light ochraceous-buff of Ridgway, 1912, as in that form; underparts purer white, the areas of basally plumbeous fur more restricted; tail less sharply bicolor, grayer above.

Color.—Type (fresh pelage): Upperparts light buff, nearly pure on cheeks, flanks and outer sides of limbs, the top of head and back rather thinly lined or overlaid with an admixture of black-tipped hairs; underparts, including lips, sides of muzzle, and inner sides of limbs white, the fur pure white to roots except along flanks and sides of abdomen where it is pale plumbeous basally; ears grayish, edged with white; feet white; tail grayish above (light and dark hairs intermixed), white below.

Skull.—Like that of *N. a. albigula*; palate concave posteriorly and first upper molar with antero-internal reëntrant angle shallow, as in the typical form.

Measurements.—Type: Total length, 337; tail vertebræ, 165; hind foot, 35. Average of two adult topotypes: 332 (329–335); 158 (157–159); 32 (31.5–32.5). *Skull* (type): Greatest length, 43.2; zygomatic breadth, 21.5; interorbital breadth, 5.9; length of nasals, 16; length of anterior palatine foramina, 8.6; length of palatal bridge, 7.7; length of upper molar series, 8.5.

Remarks.—The pallid coloration of this form readily distinguishes it from *N. a. albigula* whose range includes most of Arizona, New Mexico, eastern Texas and much of northern Mexico. *N. a. mearnsi* is probably restricted to the extremely arid desert area extending from near the type locality southward along the eastern side of the Gulf of California—a region largely covered with shifting, whitish sand. Close comparison with *N. a. melanura* and *N. a. seri* of southern Sonora is unnecessary, both being darker forms with differing cranial details. The skull of *N. a. seri* is somewhat smaller and less massive, with narrower frontal region, smaller interparietal and slightly smaller audital bullæ. Some of the specimens of *N. a. albigula* from Sonoyta, Sonora, are pale and apparently show gradation toward the present form. The pallid coloration of three or four examples of *N. albigula* from Tinajas Altas and vicinity was pointed out by Mearns* who contrasted them with the darker animals inhabiting the Gila River bottom. It was not until the accession of new material that the necessity of recognizing a new form became apparent. It is named for Dr. E. A. Mearns who collected specimens at the type locality more than 20 years ago.

Specimens examined.—Ten, all from southwestern Arizona as follows:

* Mammals of the Mexican Boundary, Bul. 56, part I, U. S. Nat. Mus., p. 480, 1907.

Gila Mountains (near Tinajas Altas), 3; Granite Mountains (near Tule Wells), 1; Tinajas Altas (type locality), 4; Tule Wells, 2.

Neotoma albigula sheldoni subsp. nov.

SHELDON WOOD RAT.

Type from Pinacate Mountains (Papago Tanks), Sonora, Mexico, No. 206,812, U. S. National Museum (Biological Survey Collection), collected by Charles Sheldon, 1915.

General characters.—A dark colored form of the *N. albigula* group, differing from *N. a. albigula* and *N. a. mearnsi* in the peculiar vinaceous buffy general tone of the upperparts.

Color.—Type (fresh pelage): Upperparts in general vinaceous-buff, purest on shoulders and sides, the back rather strongly darkened by black hairs; head grayish; underparts white, the fur pure white to roots on throat, chest, and inguinal region, as usual in *N. a. albigula ;* ears and orbital borders blackish; feet white; tail sharply bicolor, black above, white below. In one specimen the vinaceous-buff of sides extends across the abdomen, but the throat and chest are pure white as in the others.

Skull.—About like that of *N. a. albigula.*

Measurements.—Type (dry skin): Total length, 334; tail vertebræ, 136; hind foot, 32.5 *Skull* (type): Greatest length, 44; zygomatic breadth, 23.1; interorbital breadth, 5.5; length of nasals, 16.9; length of anterior palatine foramina, 8.9; length of palatal bridge, 7.4; length of upper molar series, 8.5.

Remarks.—In the pronounced vinaceous buffy shade of the upperparts and more copious admixture of black, this form contrasts strikingly with its exceedingly pallid relative, *N. a. mearnsi,* of the region along the international boundary, only 40 or 50 miles away. The two forms agree so closely in cranial details, however, that it seems best to regard them as subspecies. The dark color of the form inhabiting the Pinacate Mountains seems to be associated with that of its lava environment. It is named for the hunter-naturalist, Charles Sheldon, who collected the material which forms the basis of this description, and through whose interest and generosity much has been contributed to our knowledge of many North American mammals.

Specimens examined.—Ten, all from the Pinacate Mountains.

Noctilio leporinus mexicanus subsp. nov.

MEXICAN BULLDOG BAT.

Type from Papayo, Guerrero, Mexico. No. 126,672, male adult, U. S. National Museum (Biological Survey Collection), collected by E. W. Nelson and E. A. Goldman, April 17, 1903. Original number 16,318.

General characters.—Closely resembling *N. l. leporinus* and *N. l. mastivus* but smaller, the difference in size most noticeable in the skull. Maxillary toothrow short.

Color.—Male (type): About as in *N. l. leporinus,* the general color of upperparts rich, dark, ochraceous-tawny (Ridgway, 1912), becoming

tawny on the head, with a narrow stripe of paler fur along median line of back; underparts between zinc orange and tawny. Female: Upperparts near buckthorn brown; underparts pale yellow ocher.

Skull.—Similar in form to those of *N. l. leporinus* and *N. l. mastivus*, but smaller; maxillary toothrow shorter, the teeth relatively broader, or more extended transversely.

Measurements.—Type (dry skin): Forearm, 83.2; tibia, 37; foot, 33.5. An adult male topotype: 83.9; 37.1; 32.9. Two adult female topotypes: 82, 85.8; 35.5, 36.8; 32, 31. Skull (type):* Greatest length, 28.5 (26.4, 26.2); condylo-incisive length, 25.2 (24.7, 24.3); zygomatic breadth, 19.8 (18.6, 18.7); interorbital breadth, 7.4 (7.1, 6.8); length of maxillary toothrow, 10.7 (10.4, 10.1).

Remarks.—Specimens from various localities in South America and the West Indies have been used for comparison, of which those from Trinidad are assumed to represent typical *N. l. leporinus*,† while a pair from Mono Island have been taken to represent *N. l. mastivus*, in the absence of material from the type locality, the neighboring island of Saint Croix. While the exact status of *N. l. leporinus* and *N. l. mastivus* seems not entirely clear, South American, and West Indian specimens from as far west as Jamaica differ from the Mexican series, especially in larger size. The males in forms of *N. leporinus* are larger than the females. Occasional females, in the Mexican form, at least, may, however, have forearms about as long as males of greater general dimensions.

Specimens examined.—Nine, all from the type locality.

* Measurements of two adult female topotypes in parentheses.

† Type locality, Surinam (see Thomas, Proc. Zool. Soc. London, p. 131, March, 1911).

Vol. XXVIII, pp. 139–140 June 29, 1915

PROCEEDINGS

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A NEW PIGEON FROM CHIRIQUI, PANAMA.

BY ROBERT RIDGWAY.

[By permission of the Secretary of the Smithsonian Institution.]

In working up the pigeons of the genus *Œnœnas* for Part VII, Bulletin 50, U. S. National Museum ("Birds of North and Middle America"), the following new species was discovered.

Œnœnas chiriquensis sp. nov.

Type, unsexed, U. S. National Museum, No. 148,301, Chiriqui, Panama. Collected by E. Arcé.

Similar to *Œ. purpureotincta*, but with longer bill, wing and tail (the bill relatively more slender), color of head and neck more vinaceous, and inner webs of remiges wholly grayish brown; similar also to *Œ. nigrirostris* but bill very much more slender, upper parts more purplish (less olivaceous) brown, inner webs of remiges without cinnamomeous (wood brown) tinge, and color of under parts darker.

Adult (male ?).—Forehead and anterior portion of crown between vinaceous-drab and brownish drab, passing into deep brownish drab on posterior part of crown, occiput, and hindneck, the latter transversely spotted (a pair of subterminal spots on each feather) with purplish vinaceous or light vinaceous-lilac; * rest of upper parts dark olive brown or dark bister, passing into more purplish brown (nearly light seal brown, somewhat tinged with bronzy) on rump, upper tail-coverts, and tail,† the primaries darker and more grayish brown; sides of head and neck, foreneck, and chest plain vinaceous-drab or deep brownish drab, passing into deep vinaceous-buff or avellaneous on chin and upper throat and into brownish drab on breast and more posterior under parts, the under tail-coverts dark vinaceous-drab, tinged with brighter or clearer vinaceous-drab; axillars and under wing-coverts nearly concolor with breast, but slightly tinged with cinnamon; under surface (inner webs) of remiges grayish brown; bill black; legs and feet pale brownish (probably red in life). Wing, 153; tail, 119; culmen, 13; tarsus, 20; middle toe, 23.5 mm.

* These spots are probably not always present, as they are an inconstant feature in other forms of this genus.

† This purplish hue is more pronounced in freshly grown feathers, and a few such occur among the posterior scapulars and proximal greater wing-coverts.

Vol. XXVIII, pp. 141–144 June 29, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

EUREODON AS THE GENERIC NAME OF THE WARTHOGS.

Phacochoerus or some of its numerous variants has long been used as the generic name of the African warthogs, dating from G. Cuvier's Règne animal, volume 1, page 236, 1817, probably appearing late in the previous year. An examination of the original reference convinces me that Cuvier never used the word *Phacochoerus* as a proper generic expression. In his account of the pigs, the warthogs are well described and considered a genus apart from the true pigs. As was so frequently the case with French authors the genus is designated by the French term Les Phaco-Chœres (Fred. Cuv.). A foot note occurs written thus: *Phaco choerus;* cochon portant une verrue. At no place in the text does the single word *Phacochoerus* exist either standing by itself or in combination with a specific name. The foot note is clearly only an explanation of the French term Phaco-chœres which is not given on G. Cuvier's authority but is quoted by him as the designation of warthogs used by his brother, F. Cuvier. In the second edition of the Règne animal, 1829, page 244, the status of the name is the same although the two parts of the explanatory foot note are connected by a hyphen.

The first use of *Phacochoerus* as a proper generic term is apparently by Fisher von Waldheim in the Mémoirs de la Société Impériale des Naturalistes de Moscou, volume 5, page 417, 1817. It is here used as a Latinization of F. Cuvier's French term Phacochœre. Unfortunately it is given as a synonym of Fischer's designation of the warthogs, *Eureodon*, occurring first on page 373 and later with description and synonymy on page 417.

Eureodon and *Phacochoerus* as valid generic terms for the warthogs were published simultaneously and *Eureodon* having been given preference by Fischer, the first reviser, as well as originator of the terms, according to Article 28 of the International Code of Zoological Nomenclature should be accepted as the generic designation of the warthogs.

—*M. W. Lyon, Jr.*

JACQUINOTIA, A NEW CRAB NAME.

In 1830, William Elford Leach, in a paper entitled "On two new genera of Crustaceous animals, discovered by Mr. John Cranch, in the expedition to Congo," and published in the Transactions of the Plymouth Institution, described the genus *Prionorhynchus* (p. 170) for a pelagic larval crustacean, *P. cranchianus*, from off the northwest coast of Africa.

In 1853 Jacquinot made a new genus of spider crabs (Family Inachidæ) under the name *Prionorhynchus*, type *P. edwardsii*, from the Auckland Islands. This was described in Hombron and Jacquinot's "Voyage au Pole Sud et dans l'Océanie sur les corvettes l'Astrolabe et la Zélée," Zool., vol. 3, Crust., p. 5.

As the name *Prionorhynchus* had been used 23 years previously by Leach for a different genus, I propose the name **Jacquinotia** (*Jacquinotia edwardsii*, type) for Jacquinot's genus. —*Mary J. Rathbun.*

THE SYSTEMATIC NAME OF THE MEXICAN SPIDER MONKEY.

Mr. E. A. Goldman has called my attention to a name for the Mexican spider monkey which antedates my *Ateles tricolor* (Proc. Biol. Soc. Washington, Vol. 27, p. 141, 1914). This generally overlooked name is *Ateles neglectus* Reinhardt (Vid. Medd. nat. For. Kjöbenhavn, 1872, p. 150), type locality, Mirador, Vera Cruz. I have seen no specimens from the type locality, but a study of Reinhardt's description and an examination of some skins and skulls in the Biological Survey Collection taken by Nelson and Goldman at Tuxtepec, Oaxaca, less than 100 miles from Mirador, indicate that this species and my *Ateles tricolor* from Tehuantepec are identical. The Mexican spider monkey, which is clearly distinct from *Ateles pan* of Guatemala, should be known as *Ateles neglectus* Reinhardt. —*N. Hollister.*

THE NAME OF AZARA'S AGOUARACHAY.

As shown by Thomas,* the small "fox" of Paraguay and northern Argentina, long known under the name *Canis azarae*, should bear another name. However, *Pseudalopex azarica*, proposed for it by Thomas, is antedated by at least two earlier names. The species was first described by Azara in 1801 under the native name *Agouarachay*. Maximilian, like Burmeister and other later authors, believed the *Agouarachay* to be the same as the crab-eating dog of eastern Brazil, which was the real basis of the name *Canis azarae*. But meanwhile Gottholf Fischer in 1814 had proposed the name *Procyon gymnocercus* for the species described by Azara and, although this name has been generally overlooked, it is much earlier than any other based exclusively on the *Agouarachay*. The use of the generic name *Procyon* by Fischer was doubtless induced by the fact that Azara had placed the species next to one properly belonging to that genus and had made some comparisons with it.

* Ann. & Mag. Nat. Hist. (8), XIII, pp. 350–360, 1914.

Canis brasiliensis Schinz also refers exclusively to the *Agouarachay* and does not supersede Maximilian's *azarae* as supposed by Allen * and Thomas. Examination of the description by Schinz shows that it is based wholly on the *Agouarachay*, in fact being scarcely more than an abridged translation of the characters and measurements given by Azara. This name therefore becomes a synonym of Fischer's *gymnocercus*, as does also the recent *azarica* Thomas. *Canis azarae* of Maximilian will thus stand for the crab-eating dog of eastern Brazil selected by Thomas as the genotype of *Cerdocyon*. The synonymy of the two species will be as follows:

Canis (Pseudalopex) gymnocercus Fischer.

L'Agouarachay, Azara, Quad. Paraguay, I, pp. 317–323, 1801.
Procyon gymnocercus Fischer, Zoognosia, III, pp. 178–179, 1814.
Canis brasiliensis Schinz, Das Thierreich, I, p. 220, 1821.
Canis azarae of various authors; not of Maximilian.
Pseudalopex azarica Thomas, Ann. & Mag. Nat. Hist. (8), XIII, pp. 350–360, 1914.

Canis (Cerdocyon) azarae Maximilian.

Canis azarae Maximilian, Beitr. Naturg. Bras., II, pp. 338–343, 1826.
Cerdocyon guaraxa Smith, Jard. Nat. Lib., Mamm., IX, pp. 262–263, 1839.
Canis brachyteles Blainville, Osteogr. Mamm. (g. *Canis*), pp. 30, 32, 47, 151, fasc. XIII, 1843.
? *Canis melampus* † Wagner, Wiegmann's Archiv. f. Naturg., I, p. 358, 1843.
Canis melanostomus Wagner, Wiegmann's Archiv. f. Naturg., I, p. 358, 1843.
? *Canis thous angulensis* ‡ Thomas, Ann. and Mag. Nat. Hist. (7), XII, p. 460, Oct., 1903.
Canis thous riograndensis von Ihering, Rev. Mus. Paulista, VIII, p. 217, May, 1911.

—*Wilfred H. Osgood.*

* Mamm. Patagonia, p. 158, footnote, 1905.

† Whether this name is synonymous with *azarae* or not is doubtful; possibly it should apply to the form described from the same region (Matto Grosso) as *Cerdocyon mimax* (Thomas, Ann. and Mag. Nat. Hist. (8), XIII, p. 355, 1914).

‡ The form to which this name applies is of somewhat uncertain status, since it is probable that it ranges into the state of Bahia, which, being the only specific locality mentioned by Maximilian, may be regarded as the type locality of *azarae*.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE STATUS OF THE TUNICATE GENERA APPENDICULARIA AND FRITILLARIA.

BY PAUL BARTSCH.

Appendicularia Chamisso & Eisenhardt; hologenotype *Appendicularia flagellum* Cham. & Eis., 1821,* appears unrecognizable. With the intention of saving this generic name, Fol in 1874 decided to give it a new status by redefining it and applying it to organisms typified by *Appendicularia sicula*, Fol. In reality Fol here creates a new genus, *Appendicularia*,† with *A. sicula* Fol as hologenotype.

This genus of Fol's has been recognized by subsequent writers on the subject as the basic genus *Appendicularia*. *Appendicularia* Fol, 1874, being preoccupied by *Appendicularia* Cham. & Eis., 1821, according to the rules requires a new name and I propose in its place **Appendicula** with *Appendicularia sicula* Fol as hologenotype.

Fretillaria was cited by Agassiz, 1846,‡ but Quoy and Gaimard referred to the animals as Fretillaires § and described them under the name *Oikopleura bifurcata* Q. & G.‖ Agassiz therefore becomes the author of the genus *Fretillaria* and *Oikopleura bifurcata* is the hologenotype.

Huxley in his "Remarks upon Appendicularia and Doliolum" states :¶

"The only other notice of the genus (so far as I am aware) is that given by MM. Quoy and Gaimard. It was observed in

* Nov. Acta. Acad. Leop., Vol. 10, p. 362, t. 31, f. 4, 1821.

† Arch. Zool. exper., Vol. III, p. XLIX, 1874.

‡ Nomen. Zool. Acalephae, p. 4, "*Fretillaria* Quoy et G. Zool. de l'Astr. Fretum. Beroidae."

§ Voy. Astrolabe, Vol. 4, p. 10, 1834.

‖ *Ibid.*, pp. 304–306, pl. 26, figs. 4–7, 1834.

¶ Trans. Roy. Soc. London, p. 595, 1857.

immense masses off Algoa Bay, South Africa, and was called by them *Fritillaria*, until they afterwards became acquainted with the descriptions of Chamisso and Mertens. Recognizing as they do the priority of discovery of the former, they yet adopt the name conferred by the latter, and, without any very just reason, give to the specimens observed by themselves a new specific name, *O. bifurcata.*''

This is wrong in so far as the name *Fritillaria* is concerned, which was not mentioned by Quoy & Gaimard, but must date from Huxley, having the same hologenotype as Agassiz's name, and thus becoming an absolute synonym of it. But *Oikopleura bifurcata* Q. & G. appears unrecognizable. In the belief that he was saving this generic name, as in the case of *Appendicularia*, Fol in 1874* emended the diagnosis of *Fritillaria* to fit a group of organisms which he had described in 1872.† *Fritillaria* Fol 1874 is therefore preoccupied by *Fritillaria* Huxley, 1857, and since no other generic name appears to have been proposed to replace *Fritillaria* Fol, 1874, I suggest for it the name **Fritillum** designating *Fritillaria magachile* Fol as type.

* Arch. Zool. exp., Vol. 3, p. XLIX, 1874.

† Mem. Soc. Phys. Geneve, pp. 473-48, 1872.

Vol. XXVIII, pp. 147–148 September 21, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DIAGNOSIS OF A NEW SUBSPECIES OF MARMOT FROM COLORADO.

BY J. D. FIGGINS.

Examination of specimens of *Marmota* from northern Colorado reveals pronounced differences in both color and cranial characters, as compared with *Marmota f. luteola* Howell and *Marmota f. obscura* Howell. This subspecific form may be distinguished as follows:

Marmota flaviventer campioni subsp. nov.

Type specimen, male adult, Colorado Museum Natural History number 1235. Locality, detached range between the "North Fork" and North Platte River, eight miles north of Higho, Jackson Co., Colo. Collected by H. H. Sheldon, June 19, 1914.

Characters.—Compared in size, *campioni* differs very little from either *luteola* or *obscura*. In color, *campioni* is distinct, notably in the preponderance of white on the head, throat and under parts. Upper parts, including back, sides, outer sides of legs, and two-thirds of tail light cinnamon brown; chin, lips, nose, throat, and fore chest a pure white, which blends beneath with the darker color of the belly and disappears at the base of the tail; an irregular band of pale vandyke brown across muzzle terminating at anterior corner of eye, adjoined posteriorly by a stripe of ocher yellow which verges into white on the forehead, is interrupted at the eye, but continues below in the form of a malar patch to ear.

Measurements.—Type specimen, total length, 670; tail, 180; hind foot, 83. Skull: Zygomatic breadth, 55; rostrum, 18; condylobasal length, 87.

Skull.—When compared with skulls of *obscura* and *luteola*, the skull of *campioni* more nearly conforms to the latter, the chief differences being distinct compression of bases of pterygoids; larger and more rounded foramen magnum; nasals much flatter anteriorly; distance between postorbital processes of frontal much less; postorbital arch of frontal deeply indented opposite ends of nasals; maxillæ shorter; bullæ dis-

tinctly larger and less flattened; paroccipital processes much shorter and curved sharply forward.

A further comparison of *campioni* with specimens probably intermediate between *luteola* and *warreni*, makes it impossible to place the former with such intergrades, since it is considerably lighter in color than other Colorado forms.

Note.—*Marmota f. campioni* is named in honor of Mr. John F. Campion, President of the Colorado Museum of Natural History, whose liberality and active interest have played so important a part in the advancement of the natural sciences of the State.

Vol. XXVIII, pp. 149–150 September 21, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SNAKE FROM SOUTHERN PERU.

BY THOMAS BARBOUR.

In a small collection of reptiles submitted to me for study by Dr. Hiram Bingham of Yale University, I find two specimens of a Coronelline snake which appears to be undescribed. It resembles in many respects *Leimadophis taeniurus* (Tschudi), but differs in having the scale rows evidently regularly nineteen in number and having a somewhat lower number of both ventral and subcaudal scales, and an entirely different type of coloration. This species may be known as

Leimadophis andicolus sp. nov.

Type, an adult, M. C. Z. No. 10,987, collected at Huispang, in the Andes of southern Peru, altitude 12,175 feet, September 18, 1914, by E. C. Erdis of the Yale Peruvian Expedition.

Eye moderate; rostral slightly broader than high, scarcely visible from above; internasal suture about equal to praefrontal suture; frontal longer than its distance from end of snout, shorter than parietals, widely separated from praeocular; supraocular narrower than frontal; nasal semidivided, about equal in length to its distance from the eye; loreal small, almost square; one praeocular much broader above than below; two postoculars; temporals 2–2 on one side and 2–3 on the other; eight supralabials, fourth and fifth supralabials in contact with eye; nine lower labials, fourth in contact with anterior chin shield, one in contact with posterior; anterior chin shields much longer and wider than posterior ones; scales smooth, generally with a single apical pit, in 19 rows; ventrals 150; anal divided; subcaudals in 49 pairs.

Color pattern.—Ground color of head and body olive brown; an ill-defined middorsal lighter stripe, composed of more or less confluent light spots; two less well-defined light lateral stripes broken at regular intervals by darker blotches; an alternating series of dark brown spots on each side of the middorsal stripe, which not only alternate with each other, but with the dark blotches which interrupt the lateral light lines; sides

of head with a dark stripe running through the eye to the angle of the mouth; an indistinct dark band across the interorbital region; two other dark stripes running across the temporal regions parallel and posterior to the stripe through the eye; these posterior stripes are connected by a band which crosses just posterior to the parietal scales, and almost touches two large but rather indistinct nuchal blotches; lower surfaces light olive brown, an ill-defined series of dark olive blotches on the middle of each ventral; these blotches may almost cover the whole scale, or simply show themselves as a small median dot; they are absent from the first eight ventrals and tend to become broader and to cover more of the ventrals posteriorly.

A second specimen, M. C. Z. No. 10,986, a paratype, having the same data as the type already described, is very similar in all characters to the other specimen. Its ventrals are 144 in number, and the subcaudals 48 pairs. On both sides of the head there are three scales in the second series of temporals. The coloration of the dorsal surfaces is very similar to the other, with the exception that the lower lateral row of blotches is fused into a continuous dark band, which is bordered above by a zone slightly lighter than the general ground color. The middorsal light stripe, bounded on each side by the alternating dark blotches, is the same as the other, also the arrangement of the markings of the head. The ventrals are more generally covered by the dark blotches than they are in the type, but the same number of ventrals anteriorly are without the heavy dark blotches.

Vol. XXVIII, pp. 151–160 September 21, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

SCALES OF PANAMA FISHES.

BY T. D. A. COCKERELL.

The year before last, when Dr. S. E. Meek was working at the U. S. National Museum on his collection of Panama fishes, he very kindly allowed me to take scales of a large number of species. The present report deals with this material, including also a few species collected by others in the Republic of Panama or the Canal Zone. Whenever the collector's name is not given, it is to be understood that the material was obtained by Messrs. Meek and Hildebrand.

The following key enumerates the species studied, and shows how they may be separated. With few exceptions, a single normal (not regenerated) scale from the middle of the side will serve to distinguish a species from all the others in the collection.

Scales cycloid (obscurely ctenoid in *Gerres*) . . . . . 1.
Scales ctenoid . . . . . 15.

1. Circuli and radii entirely transverse (Clupeidæ)
Opisthonema libertate Günther. (Taboga I.)
Circuli transverse, basal only; no radii, but basal margin lobed, and radial folds faintly indicated (Atherinidæ)
Atherina arœa Jordan & Gilbert. (Porto Bello.)
Circuli concentric; radii absent . . . . . 2.
Circuli concentric, or rarely (*Opisthopterus*) essentially transverse; radii present, not transverse, or (*Gastropelecus*) only partly so . 3.

2. Circuli complete; scales very minute (Belonidæ)
Tylosurus scapularis Jordan & Gilbert. (Balboa.)
Circuli absent from apical part of scales (Characidæ)
Roeboides guatemalensis Günther. (Gatun R.)

3. Scales elongate; with very numerous radii all around (Rypticidæ)
Rypticus nigripinnis Gill. (Corazal.)
Radii not all around . . . . . 4.

4. Scales very broad and short, with very few radii; circuli absent in apical field . . . . . 5.
   Scales longer than broad, or if broader than long, not excessively so . 6.
5. Circuli extremely dense, essentially transverse (Clupeidæ)
   Opisthopterus dovii Günther. (Panama market.)
   Circuli not dense, concentric (Hemiramphidæ)
   Hyporhamphus unifasciatus Ranzani. (Balboa.)
6. Small scales, with rounded laterobasal corners, and numerous radii . 7.
   Larger scales, with angular or subangular laterobasal corners, or if (*Gastropelecus*) sometimes rounded, then radii very few . . . . 9.
7. Lateral and apical circuli crossed by fine radial lines of hyaline dots (Pleuronectidæ) . . *Citharichthys spilopterus* Günther.
   lower side (Toro Point.)
   No such lines of hyaline dots . . . . . 8.
8. Radii (all basal) less than ten (Pleuronectidæ)
   Paralichthys woolmani Jordan & Williams.
   upper and lower sides (Taboga I.]
   Radii extremely numerous; circuli in apical field broken up (Dactyloscopidæ) . . . . . *Dactylagnus mundus* Gill. (Taboga I.)
9. Radii few, mostly apical; or when many basal, central region of scales with coarse radial reticulation (Characidæ) . . . . . 10.
   Radii numerous, all apical; basal margin not lobed (Characidæ) . 11.
   Radii apical and basal; basal margin deeply lobed; center of scale not reticulated (Characidæ) . *Curimatus magdalenæ* Steindachner
   (Rio Abaco.)
   Radii basal . . . . . 12.
10. Circuli absent in apical field; centre of scale with a minute reticulation derived from the circuli
    Gastropelecus maculatus Steindachner. (Creek near Chorera.)
    Circuli broken up, but coarse and conspicuous, in apical field; some scales with a central reticulate pattern derived from the radii
    Piabucina panamensis Gill. (Rio Calobre.)
11. Circuli represented in apical field by a broken zigzag pattern
    Astyanax fischeri Steindachner. (Creek near Chorera.)
    Circuli not showing a zigzag pattern in apical field
    Astyanax grandis Meek & Hildebrand. (Rio Abaco.)
12. Scales longer than broad, with only three or four radii, in deep folds; basal margin lobed (Synodontidæ)
    Synodus evermanni Jordan & Bollman. (Taboga I.)
    Scales broader than long . . . . . 13.
13. Radii 6 to 8; basal margin strongly crenulate (Xystæmatidæ)
    Gerres rhombeus C. & V. (Mindi Cut.)
    Radii more than ten; basal margin without regular crenulations (Pœciliidæ) . . . . . 14.
14. Circuli obtusely angulate in median line above nucleus
    Pœcilia sphenops C. & V. (Corazal.)

[Circuli not angulate in median line above nucleus; scales larger.
Xiphophorus helleri Heckel. (Obispo, Mexico; S. E. Meek).]

15. Apical margin with a single row of sharp teeth, and no ctenoid elements below them; nucleus just below apical margin . . . . . 16.
Apical field with one or more rows of ctenoid elements below the marginal teeth . . . . . 19.

16. Scales with rounded base (Pleuronectidæ)
Citharichthys spilopterus Gthr., upper side.
Scales with truncate base, the laterobasal corners evident; apical margin usually like the transverse section of a roof of a house (Gobiidæ) . . . . . 17.

17. Basal radii about 7 to 9 . . . . . *Chonophorus nelsoni* Evermann (Rio Culebra.)
Basal radii more numerous . . . . . 18.

18. Scales 2.5–3 mm. long . . . . . *Philypnus maculatus* (Chepo.)
Scales less than 2 mm. long . . *Eleotris pisonis* Gmel. (Porto Bello.)
Gobius claytoni. (Mindi.)
Gobius soporator C. & V. (Fox Bay, Colon.)

19. Scales conspicuously longer than broad, parallel sided . . . . . 20.
Scales broader than long, or at most a little longer than broad . . 22.

20. Scales minute, much less than 2 mm. long; nucleus never elongate, always subapical (Soleidæ) . . . . . 21.
Scales larger, at least over 2 mm. long; nucleus often elongated, and then radii not reaching middle of scale; apical teeth often truncate (Serranidæ) . *Petrometopon panamensis* Steind. (Taboga I.)
Bodianus acanthistius Gilbert. (Panama market.)
Mycteroperca xenarcha Jordan. (Corazal.)
Paranthias furcifer C. & V. (Taboga I.)

21. Scales more or less narrowed apically; radii 3 to 5
Achirus fluviatilis. both sides (Rio Chorera.)
Scales not narrowed apically; radii very many
Symphurus plagusia B. & S. both sides (Fox Bay, Colon.)

22. Basal radii few (4 to 6), and widely spaced; subapical ctenoid elements brick-like (Mullidæ)
Upeneus maculatus Bloch. (Fox Bay.)
Basal radii many, or at least closer together, usually arranged in fan-like manner; subapical ctenoid elements not brick-like . . 23.

23. Scales minute, 1.5 mm. or less long; only about three rows of distinct ctenoid elements below the marginal teeth (Sciænidæ)
Menticirrhus martinicensis C. & V. (Fox Bay.)
Scales larger . . . . . 24.

24. Elements of ctenoid patch triangular, feebly developed, with no sharp salient marginal teeth (Xystæmatidæ)
Eucinostomus californiensis Gill. (Mindi Cut.)
Elements of ctenoid patch well developed; marginal teeth salient, narrow and sharp, or (*Stellifer* and *Orthopristis*) often slightly bifid . . . . . 25.

25. Submarginal ctenoid elements like the marginal; ctenoid patch very large; basal margin very strongly crenate, the lobules free from circuli (Cichlidæ) . . *Æquidens cæruleopunctatus* Kner & Steind. (Rio Las Sabanas, A. H. Jennings.)
Satanoperca crassilabris Steind. (Frijoles, Canal Zone.)
Submarginal ctenoid elements unlike the marginal 26
26. Submarginal ctenoid elements long, strongly ridged; basal margin not crenulate (Sciænidæ) . . . *Paralonchurus dumerili* Bocourt. (Panama, C. H. Gilbert.)
Submarginal ctenoid elements short . . . . . 27.
27. Basal margin not crenulate (Sciænidæ)
Odontoscion dentex C. & V. (Toro Point.)
Stellifer colonensis (Mindi Reef.)
Basal margin crenulate (Hæmulidæ)
Orthostœchus maculicauda Gill. (Taboga I.)
Pomadasis bayanus Jord. & Everm. (Corazal.)
Pomadasis macracanthus Gthr. (Balboa.)
Orthopristis chalceus Gthr. (Balboa.)

CHARACIDÆ.

An account of the scales of the neotropical Characidæ was published in Annals Carnegie Museum, ix, 1914. While recording the Panama species, I give some notes on others, supplementary to the paper mentioned.

BIVIBRANCHIINÆ. *Bivibranchia protractila* Eigenmann. Rockstone, British Guiana (Eigenmann). U. S. N. M. A remarkable fish, resembling *Albula vulpes*.

Scales about 2 mm. long and over 2.5 wide, broadly rounded apically, sides sloping, base very broadly truncate, laterobasal angles distinct, basal margin with a strong median lobe, nucleus central; circuli coarse, absent from apical field. No radii, but a radial fold on each side of basal lobe. The scale resembles that of the Curimatinæ, but is peculiar for the single basal lobe, and the thin weak apical field, without radii or marginal teeth.

ANOSTOMATINÆ. *Schizodon fasciatus* Spix. Bolivia (Gibbon). U. S. N. M. Large red scales, subquadrate, about 9.5 mm. long and broad, basal margin strongly bilobed, circuli very fine and dense, nucleus approximately central; apical radii few and weak, except one on each side, basal radii rudimentary; apical field coarsely pustular. The Anostomatine genera known to me are separable thus:

Scales with a strong radial line extending horizontally to each side, and two (rarely one) extending upward to apex, in lateral line scales sometimes two also to base . . . . . *Anostomus*.
Scales without such radial pattern; apical field with weak radii, usually rather numerous . . . . . 1.
1. Nucleus well below middle . . . . . *Leporinus*.
Nucleus about middle . . . . . *Schizodon*.

BRYCONINÆ. *Brycon dentex* Gthr. Nicaragua (L. F. H. Birt.). U. S. N. M. Scales about 11 mm. long and 13 broad. The three before me

are all latinucleate, but they agree with those of *B. falcatus* in all essential characters; the apical radii are many and parallel, and the apical margin is strongly crenulate or subdentate, though not ctenoid in any proper sense.

TETRAGONOPTERINÆ. Two species of *Astyanax* are given in the table above. *A. fischeri* is related in the characters shown by the scales to *A. bimaculatus*, though the scales are much smaller (5–5.5 mm. broad), the circuli are less dense, and the weak subparallel apical radii are very different. The relationship is perhaps actually closer with the still smaller scales of the *A. polylepis* group. *A. grandis* is very close to *fischeri*. Thus the two Panama species form a little group intermediate between the South American groups of *A. bimaculatus* (large scales with very coarse spreading apical radii) and of *A. polylepis, abramoides*, etc. (small scales with very weak apical radii). The *A. mucronatus* group (with V-like apical radial pattern) stands apart from all these; to it must be added *A. fasciatus* Cuvier, Rio Primero, Argentine (J. W. Titcomb). The *mucronatus-fasciatus* group is typical *Astyanax*. *Poecilurichthys*, which Eigenmann has recently treated as a distinct genus, is typified by *A. bimaculatus ;* but according to scale characters we should be inclined to include in it some of the species which Eigenmann, in his catalogue, has left in typical *Astyanax*.

GASTEROPELECINÆ. *Gasteropelecus maculatus* has scales which do not differ in any tangible way from those of *G. sternicla* L.

PIABUCINÆ. *Piabucina panamensis* has scales of the same general type as those of *Chalceus macrolepidotus*, but much smaller (length 7, breadth 8 mm.). The intermediate, minor apical radii are not so evident in the *Piabucina* as in the *Chalceus*. In all respects the scales of *Piabucina* are essentially as in the African genus *Alestes*. Both show a radial polygonal pattern in the middle, at least in some of the scales. Are the Piabucinæ separable as a subfamily from the Alestinæ?

HYDROCYNINÆ. *Luciocharax insculptus* Steind., Rio Abaco, Panama (Meek & Hildebrand). Scales subquadrate, about 6 mm. long and broad; basal margin strongly undulate, or emarginate in middle; nucleus a little above the middle; circuli fine; a few basal, apical and lateral radii (1 or 2 apical, 1 to 3 basal, 1 to 5 lateral, but when more than one lateral, they are only partly developed), in Alestiform fashion; apical field without circuli, but thrown into strong parallel pleats or folds (not radii), which end as strong sharp teeth on the margin. The circuli are microscopically beaded. These are ctenoid scales, using that word in a purely descriptive sense. There is no resemblance to *Hydrocynus*, at least judging from the scales of the latter genus seen by me, which are, however, apparently quite immature. Eigenmann states that adult scales of *Hydrocynus* have denticulate apical margins. The scale of *Luciocharax* is singularly like that of *Phractolæmus*.

CHARACINÆ. The genera of this subfamily now before me may be separated thus:

Apical field with numerous sharp isolated teeth in about four rows, one of which is marginal; base broadly rounded, with rather coarse circuli, and no radii; nucleus central. The arrangement of the teeth reminds one of the Macruridæ.

Cynopotamus argenteus Val., Paraguay (Page); U. S. N. M.

No such teeth in apical field; scale cycloid . . . . . 1.

1. Apical field with many radii, between which the circuli are very coarse and widely spaced, in complete contrast with those of the base and sides of the scale; scale about 4.75 mm. long and 6 broad; laterobasal corners rounded; no basal radii. System of circuli like that of the African genus *Sarcodaces*

Salminus maxillosus C. & V. Paraguay (Page); U. S. N. M.

Apical field without radii or circuli . . . . . 2.

2. Circuli very dense, largely transverse, wavy, broken and branching; weakly developed and very variable undulating transverse radii; scales transversely oval or nearly circular. These look like clupeid scales . . . . . *Bramocharax bransfordii* Gill.

Nicaragua (Bransford); U. S. N. M.

Circuli not very dense; apical field with evident growth-lines; no trace of radii anywhere . . . . . 3.

3. Scales small, transversely short-oval . *Rœboides guatemalensis* Gthr.

Scales extremely broad, but of the same type

Charax and *Acanthocharax*.

There are clearly indicated several tribes; Characini (*Charax*, *Acanthocharax* and *Rœboides*), Salminini (*Salminus*), and Cynopotamini (*Cynopotamus*). The *Bramocharax*, if correctly determined, represents another group.

CURIMATINÆ. *Curimatus magdalenæ* has scales like those of *C. spilurus* Gthr.

CLUPEIDÆ.

Opisthonema libertate scales (mine evidently immature) do not differ from those of *O. oglinum*, except in the absence of pitting. The first transverse radius is complete, the second always interrupted.

Opisthopterus dovii belongs to the Pristigasterinæ. The five transverse circuli and the hyaline apical field are as in the Clupeinæ, but the few radii in the basal field are directed obliquely basad, instead of being transverse. There are fine irregular apical radii, poorly developed. The apical margin is not dentate.

SYNODONTIDÆ.

Synodus evermanni scales are like those of *S. foetens*, but smaller, with the nucleus nearer the centre. Probably most of this difference is due to immaturity.

POECILIIDÆ.

Poecilia sphenops scales do not differ appreciably from those of *P. butleri*. *Xiphophorus helleri* scales resemble in structure those of *Pseudoxipho-*

phorus bimaculatus Heckel, from Quirigua, Guatemala (W. P. Cockerell), but differ in detail thus:

Scales subquadrate, about 5 mm. long and broad; apical circuli denser *Xiphophorus.*

Scales broader than long, about 3.6 long and 4.5 broad; apical circuli not dense . . . . . *Pseudoxiphophorus.*

BELONIDÆ.

Tylosurus scapularis scales look like very young scales of *T. acus.* The structure is entirely the same. My material of *scapularis* is probably immature.

HEMIRHAMPHIDÆ.

Hyporhamphus unifasciatus from Balboa, Canal Zone, differs from the same species from Woods Hole, Mass., in the absence of the dense fine circuli in the apical field, but it is immature. At the sides of the apical field in the Balboa fish there are variable feebly developed circuli running upward instead of transversely, about two-thirds as far apart as the uppermost ones of the basal field, which they almost meet. In the narrow zone between these two sets of circuli are rudiments of the fine transverse circuli which are so conspicuous in the Woods Hole fish. The Balboa fish is presumably true *H. unifasciatus;* that from Woods Hole should perhaps be referred to *H. roberti.* It remains to be seen whether fully mature scales from the Panama region will be readily distinguishable from those of the northern fish.

ATHERINIDÆ.

Atherina araea scales agree entirely in type with those of *A. pinguis* from Australia, even to the frequent presence of a curious nuclear pit. *A. araea* scales are however much smaller, about 1.5 mm. long and 3.5 broad. In Mem. Queenst. Mus., Dec., 1913, I have discussed the scales of *Atherina,* and given an account of another Panama species, *A. stipes.* The lobules in the middle of the basal margin of *A. araea* are usually two, but sometimes three.

MULLIDÆ.

Upeneus maculatus scales do not differ appreciably from those of *U. dentatus.*

RYPTICIDÆ.

The scales of *Rypticus* are so entirely different from those of the Serranidæ that a distinct family appears to be indicated. The absence of the anal spines, and other characters, further distinguish the group. The group is called Grammistinæ by Boulenger, and appears to include three genera. Jordan and Evermann recognize two subfamilies, Grammistinæ and Rypticinae.

Scales of *Rypticus nigripinnis* are minute, about 1.3 mm. long and .4 broad; greatly elongated, with rounded ends; nucleus central, elongated; radii numerous, all around; circuli coarse; margin of course wholly cycloid. Only a very small area is covered by skin. The apical

end is distinctly larger than the basal, and the apicolateral radii are curved, with the convexity upward. These scales are extraordinarily similar in general type to those of some Ophidiidæ, as *Lepophidium microlepis*.

SERRANIDÆ.

Petrometopon, *Bodianus* and *Mycteroperca* are Epinephelinæ, and have the characteristic elongated, parallel-sided scales of that subfamily. Scales of *P. panamensis* are broader than those of the Australian *Epinephelus megachir*, but otherwise little different. *Paranthias furcifer* (subf. Anthiinæ) has scales about 5 mm. long and 3.5 broad, entirely of the *Petrometopon* type. Thus it appears that the Anthiinæ can not be separated from the Epinephelinæ on the scales. *Bodianus acanthistius* scales, only about 2.5 mm. long, are structurally like the others, but with rather conspicuously bulging or convex sides. *Mycteroperca* is like *Bodianus*, but the scales are larger and the sides straighter.

HÆMULIDÆ.

The scales in this family, so far as seen, are very uniform, subquadrate, usually broader than long, always with the lower margin crenate or scalloped, a character which distinguishes them from the Sciaenidæ. In *Pomadasis* the scales are about as long as broad, and the marginal teeth are pointed. In *Orthostoechus* the scales are broader than long, length about 3, breadth 3.75 mm.; the marginal teeth are pointed. In *Orthopristis* the marginal teeth are subtruncate or obscurely bifid, and the scale is very little broader than long.

XYSTAEMATIDÆ.

The scale of *Gerres rhombeus* appears cycloid, but under the compound microscope the ctenoid patch, of weak transversely diamond shaped dentiform structures, can be seen. These are even crossed by broken and rudimentary transverse circuli. In the *Eucinostomus* these ctenoid elements are narrower and rather more distinctly dentiform, without rudiments of circuli; but the general type of structure is the same. The Australian *Xystaema darnleyensis* has lost the ctenoid patch altogether. Both the Panama species have transverse circuli reaching the middle of the lateral margin at right angles with it.

SCIAENIDÆ.

The lateral circuli are directed vertically, instead of transversely as in the last family. The scales are broader than long, and the lower margin is without distinct crenulations. Leaving out *Cynoscion*, the scales are of a very uniform type, but *Paralonchurus dumerili* is readily separated from the others by the comparatively long and narrow elements of the ctenoid patch. It has the marginal spines stout, obtusely pointed.

CICHLIDÆ.

Cichlid scales are broader than long (sometimes not greatly so), with the lateral circuli vertical, and the basal margin strongly crenate. In my

table in Bull. Bureau Fisheries, XXXII, p. 166, both the Panama species run to *Geophagus brasiliensis*, though the *Satanoperca* scale is not quite so broad as the others. The Brazilian *Chætobranchopsis ocellaris* does not have basal lobules free from circuli; but such lobules are well developed in *Chaetobranchus flavescens*, as in the Panama species. *Tilapia nilotica* has short broad lobules free from circuli.

GOBIIDÆ.

The Panama scales confirm the very distinct and nearly uniform Gobiid type, already discussed elsewhere.

DACTYLOSCOPIDÆ.

Dactylagnus mundus has already been discussed in Proc. Biol. Soc. Wash., XXVI, p. 91.

PLEURONECTIDÆ.

Paralichthys woolmani scales, as represented by my material, are much smaller than those of *P. oblongus*, but the structure is the same.

Citharichthys spilopterus are also small, but structurally closely resemble *Syacium papillosum*, the lateral field being essentially after the manner of this species, not as in *Citharichthys arctifrons*.

SOLEIDÆ.

Achirus fluviatilis scales agree structurally with *A. lineatus*. *Symphurus plagusia* scales essentially agree with those of *S. piger*.

Note.—In Proc. Biol. Soc. Wash., XXVI, p. 77, the scale of *Bregmaceros* is discussed, and said to apparently lend some support to the Tims theory of the origin of teleostean scales. Further investigation shows that this idea was based on an error of interpretation, and other studies appear to show conclusively that the Tims theory is incorrect.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF THREE NEW BIRDS FROM CHINA AND JAPAN.

BY J. H. RILEY.

[By permission of the Secretary of the Smithsonian Institution.]

Mr. Arthur de C. Sowerby, who has been collecting natural history material for the U. S. National Museum in the Chinese Empire for a number of years, has from time to time sent in small lots of birds. During the past year a much larger series of fine skins was obtained in the Province of Chihli and from Manchuria, and a comparison of this material with that already possessed by the Museum has enabled me to differentiate a few forms not included in Mr. Sowerby's collections. These are described below.

As the distribution of the birds in the Chinese Empire, especially the interior, is not any too well known, I intend later to prepare a catalogue of Mr. Sowerby's collections, including such data as a study of his material permits.

For the loan of a series of seven specimens of *Dryocopus martius martius*, the author is indebted to the authorities of the Museum of Comparative Zoology.

Tetrastes bonasia vicinitas subsp. nov.

Type, U. S. National Museum, No. 120,574, adult male, Hakodate, Yezo, Japan, November 22, 1883. Collected by Harry V. Henson.

Similar to *Tetrastes bonasia bonasia* but much grayer above, the scapulars and frons with much more white. Wing, 175; tail, 139.5; culmen, 16.5.

Remarks.—Seebohm * in his description of *Tetrao bonasia septentrionalis* specifies no definite habitat, except that it is a Siberian arctic form. In

* Ibis. 1884, 430.

Mr. Sowerby's collection there are two adult males from near I-mien-po (near Ninguta), N. Kirin, Manchuria, taken in October, that I refer to *T. b. septentrionalis.* They are very much alike and differ from *T. b. vicinitas* in being darker gray above, the black barring upon the mantle more pronounced, in having a bare indication of the white scapular bar, and the barring below heavier. A female specimen from the Valley of the Yenesay, Lat. 66½°, seems to represent still another form, grayer than *T. b. bonasia* with more white spotting upon the scapulars and wings and the bars below darker and much more numerous. This Yenesay specimen is much nearer *T. b. vicinitas* than *T. b. bonasia* but differs from the former in not having so much white on the scapulars, the barring below more pronounced, and the bill smaller. Possibly it may represent *Tetrastes orientalis* Madasasz.*

Whenever a large series of these grouse from the various parts of its range can be got together and thoroughly studied, some interesting results are to be expected.

The following are the measurements of the series before me for comparison:

	Wing	*Tail*	*Culmen*
Three males, Europe	169.2	116.8	15.7
Two males, Manchuria †	161.5	110.2	16.7
One male, Yezo, Japan	175	139.5	16.5
One female, Europe	156	116	15
One female, Valley Yenesay	156	93	13.5
Two females, Yezo, Japan	167.5	115.5	14.7

Dryocopus martius silvifragus subsp. nov.

Type, U. S. National Museum, No. 120,551, adult male, Hakodate, Yezo, Japan, December 2, 1884. Collected by Harry V. Henson.

Similar to *Dryocopus martius reichenowi* Kothe,‡ but black, not so slaty and bill smaller. Wing, 243; tail, 190; culmen, 62.

Remarks.—I have compared the Japanese bird with a male from I-mien-po (near Ninguta), N. Kirin, Manchuria, and a female from Hsing-lung-shan, 65 miles northeast of Peking, China, and a series of eight specimens from Europe. Hartert || unites *D. m. reichenowi* with *D. m. martius* but, in my opinion, is not justified in doing so, as the former is a much larger bird in all its measurements and is also of a deeper slaty black. The Japanese specimens have a brownish cast to the black, especially noticeable upon the wings, but this is due most probably to the length of time the birds have been in the collection, as Doctor Stejneger§ in reporting upon them says they were of a "very intense black." The two specimens of *D. m. reichenowi* before me are of a very deep black

* Ann. Mus. Nat. Hung., vii, 1909, 178.

† *T. b. septentrionalis.*

‡ Orn. Monatsber., 1906, 95.

|| Vögel palaark Fauna, heft vii, 1912, 932.

§ Proc. U. S. Nat. Mus., XV, 1892, 301.

with a slight slaty cast, but leaving out of consideration the differences in the intensity of the black in the different specimens before me, as some of it is probably due to the length of time the birds have been kept in collections, whether exposed to light or not, the differences in the size of the bill will, in my opinion warrant the separation of an east Asiatic and a Japanese race.

A male from Sakhalin Island* agrees fairly well with Japanese birds and in measurements is even slightly smaller. For the present, I refer it to the Japanese race. Lönnberg† in writing upon the Sakhalin bird says they average a little larger and are more intensely black and glossy with the crimson of the head more brilliant than in European specimens. He also gives a table of measurements of ten specimens.

The material before me of the three races under consideration measures as follows:

	Wing	*Tail*	*Culmen*
Three males of *D. m. martius*	238.2	162.8	56.3
One male of *D. m. silvifragus*	243	190	62
One male of *D. m. reichenowi*	256	209	64
One male, Sakhalin Island	238	180	59
Three females of *D. m. martius*‡	240	168.5	55.5
One female of *D. m. silvifragus*	240	185	59
One female of *D. m. reichenowi*	248	205	60

Eophona melanura sowerbyi subsp. nov.

Type.—U. S. National Museum, No. 213,242, adult male, Chang Kow Hsien, Hupeh, China, February 4, 1908. Collected by Walter R. Zappey.

Similar to *E. m. melanura* but much lighter in color above and below; the rump lighter gray, inclining to whitish posteriorly (uniform neutral gray in *E. m. melanura*); the black of the wings, tail, and head less intense. Wing, 107.5; tail, 82.5; culmen, 20.5; tarsus, 22; middle toe, 18.

Female differs from the same sex in *E. m. melanura* in being lighter below with the top of the head concolor with the back, which is near Saccardo's umber (grayish in *E. m. melanura*) the black of the wings and tail less intense. Wing, 104; tail, 82; culmen, 21; tarsus, 22; middle toe, 18.

Remarks.—Loxia melanura Gmelin§ was founded on Le Gros-Bec de la Chine of Sonnerat.‖ Latham's¶ description seems to be a mere translation of Sonnerat. The bird that served Sonnerat for his description

* U. S. N. M. No. 159,334.

† Journ. Coll. Sci. Imp. Univ. Tokyo, xxiii, Art. 14, 1908, 44.

‡ One female in this series is extraordinarily large, much larger than any male of *D. m. martius* before me, and really nullifies the value of this set of female averages for comparison.

§ Sys. Nat., i, pt. i, 1788, 853.

‖ Voy. Ind. Orient. et Chine, ii, 1782, 199.

¶ Syn. Birds, ii, pt. i, 1783, 145.

was probably procured somewhere on the coast where his expedition touched and not from the interior.

The National Museum possesses two males and three females from Kiangyin, near the mouth of the Yang-tze-kiang, males taken in February and the females in December. They are all uniformly dark and so different from the Hupeh specimens that no ornithologist upon comparison would think of uniting them. The Hupeh male in color is very much like *E. m. migratoria* but is a little lighter and has a heavier bill. The male of *E. m. melanura* has the chest mouse gray while in *E. m. sowerbyi* it is a pale mouse gray and less extensive in area, occurring in a semi-ring below the black of the throat, the rest of the chest being washed with vinaceous buff.

The three forms measure as follows:

Males	*Wing*	*Tail*	*Culmen*	*Depth of bill*
One *E. m. sowerbyi*	107.5	82.5	20.5	17
Two *E. m. melanura*	102.7	80.5	22.2	17.5
Three *E. m. migratoria*	98.3	73.3	20.5	15.2
Females				
One *E. m. sowerbyi*	104	82	21	17.5
Three *E. m. melanura*	101.7	74.2	21.2	16.8
Four *E. m. migratoria*	96.5	66.6	19.4	14.7

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PROCEEDINGS

OF THE

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NEW GENERA AND SPECIES OF ACOCEPHALINÆ. [HOMOPTERA.]

BY E. D. BALL.

In collecting along the Pacific coast at different times the writer has taken a number of new species of leaf-hoppers apparently belonging to a closely related group of forms. Most of these insects have been black or dark brown in color with ivory-white markings—a striking color combination and one that is rare in the leaf-hoppers. In working up these forms a general study was made of other black species with the result that it was determined that another black form was incorrectly placed and a new genus is made for it and its South American allies.

Nionia new genus.

Closely resembling *Tartessus* of Stal, but not possessing a supernumerary cell in the wing. Superficially resembling *Pediopsis* in general shape of head and pronotum but with the ocelli near the vertex margin.

Vertex appearing as scarcely more than a line bounding the conically produced anterior margin of the pronotum, except at the apex where it is conically produced and appears to be twice the length next to the eye, anterior margin rounding almost inperceptibly to front. Front broad, convex in both diameters forming with the vertex and pronotum a blunt cone. Ocelli just under the vertex margin, nearly as far from the eye as from the apex of vertex. The lateral margins of front broadly rounding into the vertex margin above and the long narrow clypeus below. Surface especially along the side rather coarsely wrinkled. Pronotum exceptionally long, due to the conically rounding anterior projection, extending over one-half its length into the head. Posterior margin broadly rounding with a slight median emargination. Surface finely wrinkled. Elytra coriaceous, moderately long with narrowly rounding apices. All veins margined with lines of punctures giving a double-veined effect on

clavus. Venation of corium regular, two cross-nervures present, apical cells longer than wide.

Type of genus *Goniagnathus palmeri* V. D.

This genus is apparently closely related to the Old World genus *Tartessus*, but differs in the venation and head characters. It appears to have no close relatives in our fauna, but should be placed between *Memnonia* and *Driotura* on the one hand and *Xestocephalus* on the other. It is apparently a South American group, *N. palmeri* of the southern States and Mexico being the only representatives north of the Isthmus. All the known species are jet black in color. The genus *Goniagnathus* does not occur in America.

Uhleriella ziczac n. sp.

Form of *coquilletti* nearly, intermediate in color pattern between that species and *stygica*. Vertex and pronotum dark with narrow light margins. Length, 4–5 mm.; width, 1.5 mm.

Vertex almost right angled, the apex slightly acute, slightly sloping, depressed before the margin, especially at apex. Venation as in *coquilletti*.

Color dark iridescent brown shading to black on the anterior part of pronotum. Vertex margins and posterior margin of pronotum lined with white or yellowish white. The inner nervure of clavus, the ends of the outer nervure, all transverse veinlets on corium, the apical margin and the inner fork of first nervure lined with ivory white. These markings appear as three slightly oblique bands across the apical half of the elytra, the inner one connected in a right angle with the line on the inner sector. Below dark, face black with a transverse band crossing lower half of front ivory white. Legs dark, the tibia lined with light.

Genitalia: Female segment very slightly emarginate and depressed in the center of the posterior margin. Male plates long-triangular, their apices slightly developed as finger-like processes.

Described from two females and two males from Pasadena, California. Closely related to *stygica* and *coquilletti* from the former of which it can be separated by the angular head and the white lines, and from the latter by the solid dark head and pronotum and the male genitalia.

Uhleriella pasadena n. sp.

Resembling *signata* in form and appearance. Color pattern similar to *coquilletti* except much paler. Length, 5.5 mm.; width, nearly 2 mm.

Vertex slightly broader than in *coquilletti*, slightly roundingly right angled, disc sloping with a shallow depression before the margin. Elytra broad, abruptly slightly obliquely truncated posteriorly. Venation similar to *ziczac*, but with one or two cross-nervures between the claval veins and usually two or three reflex veinlets to costa at the apex of the outer anteapical cell.

Color rusty straw ornamented with smoky brown and ivory white.

Vertex rusty straw color, a dark band just back of the margin. Pronotum rusty straw with the margin lined with white. Scutellum rusty, a pair of triangular spots just inside the angles and a pair of round dots on disc. Elytra rusty subhyaline with the nervures light, mostly margined with smoky brown. Claval nervures including the transverse veinlets and all transverse nervures on corium broadly ivory white.

Genitalia: Female segment long with a broad and equally deep, black-margined, median excavation.

Described from a single female from the hills back of Pasadena, California. A male from the same locality which probably belongs here is darker and has rather long-triangular plates with bluntly rounded tips. The ivory white markings on elytra will separate this species from *signata*, while the genitalia are quite distinct from that of *coquilletti*.

Drionia new genus.

Resembling *Uhleriella* in color and venation, but differing widely in form of head. Head resembling *Driotura*, but still broader and shorter and with the lower part of face strongly inflated.

Vertex short and broad, a little over one-half as long as the pronotum, anterior margin broadly evenly rounding, one-fourth longer in the middle than against the eye. Surface sloping and rounding over to the inflated front without definite margin except for a slight carina on the median third. Ocelli one-third the distance from the eye to apex. Front inflated, almost vertical for two-thirds of its length, then rounding into the long narrow clypeus. Lorae elongate, strongly transversely convex. Pronotum scarcely twice wider than long, anterior margin broadly rounding, posterior margin very slightly roundingly emarginate, surface transversely wrinkled. Elytra short, broad, coriaceous, slightly inflated behind the middle. Venation similar to *Uhleriella*, the second cross-nervure present, anteapical cells long, apicals short, veinlets to costa at both extremities of the anteapicals reflexed and usually forked or doubled.

Type of genus, *D. nigra* n. sp.

This genus together with *Cochlorhinus* and *Uhleriella* are all peculiar to the Pacific coast region, and while differing widely in head characters, all have the same type of venation and are usually black or dark with ivory ornamentation.

Drionia nigra n. sp.

Resembling the alate form of *Driotura gammaroidea*. Superficially resembling black examples of the genus *Macropsis*. Black, the male with an oblique dash on each elytron. Length, 4 mm.; width, 2 mm.

Vertex sloping, rounding to the front without a definite margin except for a slight carina, one-third longer on middle than against the eye. Front broad, tumid, rounding back to the small slender clypeus. Elytra broad and short, gibbous behind the middle. Venation as in *Uhleriella* except that the outer anteapical is not acuminate posteriorly.

Color: Black, a white band across the face crossing the lower third of front and an oblique ivory white dash on the inner branch of the outer sector of the corium. Tibiae rufous.

Genitalia: Female segment short, broadly rounding posteriorly, slightly elevated on the median line giving the appearance of a slight notch. Male valve broadly rounding, plates narrow, triangular, longer than wide, their apices inclined to be finger-like.

Described from two females and two males collected by the writer at Medford, Oregon.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

PRELIMINARY DIAGNOSES OF SEVEN APPARENTLY NEW NEOTROPICAL BIRDS.

BY W. E. CLYDE TODD.

The present paper is the third of the series appearing in these Proceedings dealing with the apparently new birds discovered from time to time in the collections received by the Carnegie Museum from tropical America. As before, the descriptions are admittedly brief and preliminary in character, as it is expected that all of the forms here named will be treated more at length at some future time. The author's acknowledgments are due to Mr. Harry C. Oberholser for making critical comparisons of several of the forms here described.

Euscarthmus olivascens sp. nov.

Above, including outer margins of remiges and rectrices, yellowish olive, duller and browner on the pileum; auriculars dull brown; throat dull white, with obscure brownish streaks; breast with a band of pale brown, laterally shaded with olive, and streaked with dull white; abdomen white, obscurely streaked with grayish brown anteriorly and laterally, the flanks and under tail-coverts tinged with pale greenish yellow; under wing-coverts pale yellow. Wing, 56; tail, 45; bill, 12.

Type, No. 43,820, Collection Carnegie Museum, adult male; Rio Surutu, Bolivia, April 30, 1911; José Steinbach.

Attila arizelus sp. nov.

Pileum medal bronze, passing into cinnamon brown on the back, scapulars and tertiaries; rump and upper tail-coverts primuline yellow; tail Prout's brown; remiges dusky, the primaries margined externally with hair brown, the secondaries with cinnamon brown; middle and greater coverts tipped with ochraceous tawny, the lesser series with cinnamon brown; throat citrine, obscurely streaked with sulphine yellow;

breast brownish citrine, the streaks obsolete; abdomen white medially, the sides, flanks, and under tail-coverts strongly tinged with buffy yellow.

Type, No. 44,050, Collection Carnegie Museum, adult male; Rio Yapacani, Bolivia, August 26, 1913; José Steinbach.

Coryphistera alaudina campicola subsp. nov.

Similar to *Coryphistera alaudina alaudina* Burmeister, but general coloration decidedly paler throughout, the upper parts with more buffy, less brown, and the under parts not so heavily streaked.

Type, No. 32,962, Collection Carnegie Museum, adult male; Guanacos, Bolivia, August 23, 1909; José Steinbach.

Phœthornis subochraceus sp. nov.

Somewhat resembling *Phœthornis squalidus* (Temminck), but more cinnamomeous below, and rectrices with white tips.

Type, No. 43,585, Collection Carnegie Museum, adult (male?); Santa Cruz de la Sierra, Bolivia, May 30, 1909; José Steinbach.

Columba inornata proxima subsp. nov.

Similar to *Columba inornata inornata* Vigors, but general coloration decidedly paler and grayer, and the greater wing-coverts with narrower white margins.

Type, No. 39,892, Collection Carnegie Museum, adult male; Los Indios, Isle of Pines, December 13, 1912; Gustav A. Link.

Asturina nitida pallida subsp. nov.

Similar to *Asturina nitida nitida* (Latham) of eastern and northern South America, but everywhere lighter colored, the dark barring paler and narrower.

Type, No. 43,807, Collection Carnegie Museum, adult female; Rio Surutu, Bolivia, September 15, 1910; José Steinbach.

Crax annulata sp. nov.

Adult female similar to that of *Crax pinima* Pelzeln, but with much more white beneath, the white barring extending to the chin, and the crest-feathers more extensively white.

Type, No. 44,563, Collection Carnegie Museum, adult female; Don Diego, Colombia, January 26, 1914; M. A. Carriker, Jr.

Vol. XXVIII, pp. 171–174 November 29, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF IRESINE FROM THE UNITED STATES.

BY PAUL C. STANDLEY.

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Iresine is one of the larger genera of the Amaranthaceae, being represented in North America by approximately thirty species, and in South America by many others. The genus is chiefly tropical, only three species being known to occur in the United States. Hitherto only a single one, *Iresine celosioides* L., has been reported from this area, but there are two others which are undescribed, one of them an inhabitant chiefly of northeastern Mexico, but extending also into Arizona, New Mexico, and western Texas, and another which is here discussed.

Apparently no one has ever doubted that the *Iresine* which ranges from Maryland to Tennessee and Kansas, and southward to Alabama and eastern Texas, is the same as the Linnaean *I. celosioides*, a species which has a wide range in tropical America, and occurs also along the southern borders of the United States. It has never been given a distinctive name, even by any of the early American botanists who were sometimes wont to pronounce a plant a distinct species simply because it came from a locality well outside the previously known range of the species to which it really belonged. Indeed, the present plant seems to have received little attention from botanists of the United States, few of whom have been acquainted with it in the field. This ignorance of the live plant is well proved by the fact that all the manuals describe it as an annual, while, as a matter of fact, it is a perennial with long

slender rootstocks. This character is sometimes shown in herbarium material, but too often the dried specimens show nothing of the underground parts. *Iresine celosioides* is typically an annual, with a slender or stout taproot. Under favorable tropical conditions the plants doubtless persist for more than a single season, but they never, so far as known, develop rootstocks. Nor is this important difference in habit the only character which differentiates the two species. In *Iresine celosioides* the sepals of the pistillate flowers are 3-nerved, usually obtuse, and longer than the utricle, while in the species here described they are faintly 1-nerved, acute, and equal to or usually shorter than the utricle. In herbarium material there is an evident difference in general appearance, the leaves of the former being usually yellowish, small, and thick, while those of the latter are bright green, larger, and thin.

Iresine rhizomatosa Standley sp. nov.

Iresine celosioides Michx. Fl. Bor. Amer. 2: 244. 1803, and of many other authors; not *Iresine celosioides* L.

Iresine paniculata Uline & Bray, Bot. Gaz. 21: 353. 1896, in part, and of recent American authors; not *Celosia paniculata* L.

Perennial from slender elongate horizontal rootstocks; stems commonly solitary, herbaceous, stout or slender, erect, 3–15 cm. high, usually simple up to the inflorescence, sparsely villous with short hairs, more densely villous at the nodes, sometimes glabrous throughout, the nodes slightly swollen, the internodes 5–14 cm. long; petioles slender, 0.8–3 cm. long; leaf blades broadly deltoid-ovate to ovate or elliptic-oval, 6–15 cm. long, 2–7 cm. wide, acute or rather abruptly acute to long-acuminate at the apex (or the lowermost very rarely obtuse), truncate to acute at the base and usually slightly decurrent, thin, bright green, bearing a few scattered short stout hairs on the upper surface along the veins, sparsely pubescent beneath with short stout soft hairs, or sometimes nearly glabrous; pistillate panicles 7–30 cm. long and 2.5–20 cm. broad, much branched, the stoutish branches erect or ascending, usually dense, sparsely villous, the spikelets alternate or opposite, stout, densely flowered, 0.5–2 cm. long, the staminate panicles often laxly branched and with longer spikelets; bracts white, equaling or somewhat shorter than the sepals, ovate to ovate-orbicular, acute or acutish; sepals ovate-oblong or oblong, acute or acuminate, 1–1.3 mm. long, faintly 1-nerved, white, the pistillate flowers bearing copious long white wool at the base; lobes of the staminal cup nearly obsolete; utricle equaling or commonly longer than the sepals; seed suborbicular, dark red, shining, 0.5 mm. in diameter.

Type in the U. S. National Herbarium, No. 865,290, collected in shaded

alluvial soil on the south side of Plummers Island, in the Potomac River, Montgomery County, Maryland, October 4, 1915, by Paul C. Standley (No. 12,500).

Additional specimens examined: Maryland: Plummers Island, 1896, *Topping ;* in 1903, *Kearney* 173; Oct. 18, 1896, *Pollard, Topping & Olds* (no other locality is given than the heading of the label, which is "District of Columbia," but the specimens probably came from Plummers Island). Tennessee: Knoxville, 1898, *Ruth* 182. Nashville, 1877, *Ward;* in 1883, *Gattinger*. Alabama: In 1878, *Mohr*. Missouri: Eagle Rock, 1896, *Bush* 445. Lakeside, 1908, *Bush* 5160. Kansas: Arkansas City, 1891, *Carleton* 486. Oklahoma: *Palmer* 281. Cimarron River, 1895, *J. H. Kimmons*. Near Jennings, 1896, *Ward* 36. Sapulpa, 1894, *Bush* 482. Texas: *Lindheimer* 1111. Columbia, 1899, *Bush* 336. Near Houston, 1898, *Thurow ;* in 1912, *G. L. Fisher* 176.

The writer has also seen other specimens of this species in the herbarium of the New York Botanical Garden and in the Gray Herbarium, but unfortunately no record of them has been kept.

The occurrence of the plant upon Plummers Island is of great interest, for the station is the northernmost locality now known for the species and for the genus. It seems probable that seeds have been brought down by the Potomac from some locality in the mountains, although the genus is not known upon the east slope of the Alleghanies; or perhaps the plants are the last survivors of ancestors which had a wider range in Maryland and Virginia. There are several colonies of the plant upon Plummers Island consisting of numerous individuals, but in 1915 only two or three plants flowered.

Vol. XXVIII, pp. 175–176 November 29, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

AN ANATOMICAL NOTE ON THE GENUS CHORDEILES SWAINSON.

BY ALEX WETMORE.

Mr. F. E. Beddard * in 1886, quoting a manuscript note left by Professor Garrod, stated that the genus *Chordeiles* possesses no gall bladder. Two years later Dr. R. W. Shufeldt † in comparing *Chordeiles* with *Antrostomus* says that "*Antrostomus* possesses a small gall-bladder, while the several species of *Chordeiles* lack this organ." Still later Beddard ‡ again stated that *Chordeiles* possesses no gall bladder. Following these authorities Mr. H. C. Oberholser § used the lack of a gall bladder as one of the minor characters upon which he founded the family Chordeilidæ.

Bearing these statements in mind, I was interested in examining critically such individuals of the genus *Chordeiles* as came into my hands. The dissections made by Garrod and by Shufeldt, recorded above, may have been made upon specimens of nighthawks that were poorly preserved, as on opening a specimen of *Chordeiles virginianus*, killed near the mouth of Bear River, Utah, during the past fall, I found a distinct receptacle for bile developed in the right hepato-enteric duct and later found the same condition in two additional specimens.

As is the case in other related forms the right lobe of the liver is the larger in the nighthawk. On raising this lobe

* On the Syrinx and Other Points in the Anatomy of the Caprimulgidae, P. Z. S., 1886, p. 151.

† Studies of the Macrochires, Morphological and Otherwise, Linn. Jour.-Zool., Vol. XX, 1888, p. 317.

‡ Structure and Classification of Birds, London, 1898, p. 234.

§ Monograph of the Genus Chordeiles Swainson, Type of a New Family of Goatsuckers, Bull. 86, U. S. N. M., 1914, p. 9.

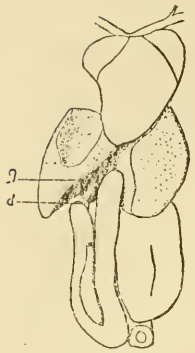

FIG. 4.
Viscera in *Chordeiles virginianus* with right lobe of liver raised to show position of gall bladder. *g*, gall bladder; *d*, cysto-enteric duct (about life size).

the gall bladder (Fig. 4, *g*) is found in the usual position above it in contact with the anterior end of the small intestine and the adjacent side of the stomach. It lies externally to the median line of the lobe. Seen from above when fully distended this cyst is elliptical. In outline from the side it appears somewhat triangular with rounded angles. This triangular appearance is intensified in alcoholic specimens. In several examined the posterior portion, nearly empty of bile, projects from the main body of the cyst as an elongate sac. In one specimen (A. W. No. 2783) the gall bladder measures approximately 7 mm. long by 3.5 mm. wide. The cysto-enteric duct (Fig. 4, *d*) rises near the center of the sac on its external side and passes back to empty into the ascending arm of the duodenum near its summit.

Through the courtesy of Dr. C. W. Richmond, Acting Curator of Birds in the United States National Museum, I have been able to examine three alcoholic specimens of *Chordeiles acutipennis* (U. S. N. M. Nos. 17,487, 17,488 and 18,791) in the Division of Birds. In each of these a gall bladder, identical in position and form with that above described in *C. virginianus* was found. In No. 17,487 this cyst measured 6.8 mm. long by 3.4 mm. in vertical diameter. In the other two specimens the sac was less perfectly preserved. In these specimens the cysto-enteric duct had the same point of origin and emptied into the same portion of the duodenum as in *Chordeiles virginianus*.

In the preparation of this paper no attempt has been made to distinguish subspecies among the nighthawks, as the work was done entirely with alcoholic specimens, difficult to determine other than specifically. In the drawing (Fig. 4), made from *Chordeiles virginianus*, the points illustrated are necessarily made somewhat diagrammatic. The right lobe of the liver has been raised to show the gall bladder and the upper portion of the pancreas removed to uncover the cysto-enteric duct. The point of origin of this duct is hidden, as is also the place at which it empties into the intestine.

Vol. XXVIII, pp. 177–178 November 29, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW PIGEON FROM JAMAICA.

BY ROBERT RIDGWAY.

[By permission of the Secretary of the Smithsonian Institution.]

In studying the pigeons of the genus *Chlorœnas* for Part VII, Bulletin 50, U. S. National Museum ("Birds of North and Middle America"), the following new form was discovered and is herewith described.

Chlorœnas inornata exigua subsp. nov.

Type, adult male, U. S. National Museum, No. 236,735, Cumberland Valley, Jamaica, February 27, 1866. Collected by W. T. March.

Similar to *C. i. inornata*, but decidedly deeper in color, the back and scapulars browner (approaching olive-brown), the head and neck deep vinaceous-drab, the forehead between hays brown and vinaceous-brown, the chest, breast, etc., between sorghum brown and vinaceous-brown. Wing, 229; tail, 143; culmen, 19; tarsus, 29; middle toe, 36.5.

Adult female very similar to the adult male of *C. i. inornata*, but forehead deeper colored (nearly concolor with rest of pileum). Wing, 222; tail, 127; culmen, 19.5; tarsus, 29.5; middle toe, 37.

Vol. XXVIII, pp. 179–184 November 29, 1915

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

MACACA VERSUS PITHECUS AS THE GENERIC NAME OF THE MACAQUES.

The monkeys having the common name macaque have long borne the generic designation *Macaca* Lacépède, 1799, or the more usual spelling, *Macacus* Desmarest, 1820. In 1909, in the Annals and Magazine of Natural History, series 8, volume 4, page 250, Dr. D. G. Elliot adopted for these monkeys the generic name *Pithecus* of E. Geoffroy and G. Cuvier in the *Magazin encylopédique*, 1795, volume 3, page 462. In the Review of the Primates, volume 2, page 176, Doctor Elliot again uses *Pithecus* as the generic term for the macaques and in a footnote selects by elimination *sinica*, the last named species in Geoffroy and Cuvier's *Pithecus*, as the type of the genus. The other four species included by Geoffroy and Cuvier are *veter*, *silenus*, *faunus* and *cynomolgus*. Of these four Doctor Elliot says the first three are undeterminable and that *cynomolgus* is a *Papio* and equals *Simia hamadryas* Linnaeus.

In 1894, Mr. Oldfield Thomas selected *veter* as the type of *Pithecus* (Ann. Mus. Civ. Stor. Nat., Genova, ser. 2, vol. 14, p. 664). He deliberately did this because Blanford (Proc. Zool. Soc. London, 1887, p. 622) had shown *veter* to be an undeterminable species. Thus *Pithecus* was "consigned to the limbo of unrecognizable names." Mr. Thomas' action appears to me to be final under the International Code of Zoological Nomenclature. His method of selecting the type was by the first species rule and it might be urged that this method has no standing under the Code. It does not seem to be a matter of any importance by what mental process an author arrives at the selection of a genotype so long that one is selected. Doctor Elliot's selection would be equally open to objection as he followed the method of elimination. In view of the possibility that some one might doubt the validity of Mr. Thomas' action, I now deliberately select *veter* as the type of Geoffroy and Cuvier's genus *Pithecus*. Hence *Pithecus* must be dropped as the technical name of the macaques and the more familiar *Macaca* be restored.

—*M. W. Lyon, Jr.*

CYMOPOLIA VERSUS PALICUS.

In 1897 (Proc. Biol. Soc. Washington, vol. 11, p. 93), I replaced the crab genus *Cymopolia* Roux (Crustacés de la Méditerranée, 1828, p. [77]; type, *C. caronii* Roux, 1828) with *Palicus* Philippi (Zweiter Jahresber. d. Vereins f. Naturk. in Cassel, 1838, p. 11; type, *P. granulatus* Philippi, 1838 = *C. caronii* Roux, 1828), because the name *Cymopolia* had been used in 1816 by Lamouroux (Histoire des polypiers coralligènes flexibles, 1816, p. 292) for a genus of polyps. I did not then know that Lamouroux's genus though classed by him with the polyps is in reality an alga.

As the same name may be used for two genera in different kingdoms, *Cymopolia* is tenable for a crab as well as an alga. The name *Cymopolia* Roux is therefore restored and the family of which it is the type will be known as Cymopoliidæ. —*Mary J. Rathbun.*

NOTES ON SEVERAL PREOCCUPIED GENERIC NAMES (AVES).

Stenopsis Cassin, 1851, for a genus of neotropical Caprimulgidæ, is preoccupied by *Stenopsis* Rafinesque, 1815 (Analyse, p. 113), a genus of Coleoptera. It may be renamed **Thermochalcis** * (type, *Caprimulgus cayennensis* Gmelin).

Oreomyias Berlepsch, 1907, a genus of Tyrannidæ, is not available, owing to the prior *Oreomyias* of Reichenow, 1902, a genus of Muscicapidæ. For the former I propose to substitute **Oreotriccus** † (type, *Pogonotriccus plumbeiceps* Lawrence).

Oreospiza Ridgway, 1896, a genus of Fringillidæ of North America, is long antedated by *Oreospiza* Keitel, 1857, for an Old World group in the same family. The later genus is here renamed **Oberholseria** ‡ (type, *Fringilla chlorura* Audubon).

Lamprotes Swainson, 1837, a genus of Tangaridæ, is invalidated by *Lamprotes* "R. L.," 1817, proposed in Lepidoptera. As Swainson's genus appears to have no available synonym, I suggest for it **Compsothraupis** § (type, *Tanagra loricata* Lichtenstein).

Odontorhynchus Pelzeln, 1868, a genus of Troglodytidæ, is preoccupied by *Odontorynchus* Leach, 1830, for a genus of Crustacea. It may be called **Odontorchilus** ‖ (type, *Odontorhynchus cinereus* Pelzeln).

—*Chas. W. Richmond.*

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* θερμός, warm; χαλκίς, a night bird.

† ὄρος(ὄρεος), mountain; τρίκκος, a small bird.

‡ For Harry Church Oberholser.

§ κομψός, elegant; θραυπίς, a small bird.

‖ ὀδούς(ὀδόντος), tooth; ὀρχίλος, wren.

GROSSULARIA MARCESCENS.

In the year 1874 a Japanese gooseberry was described by Maximowicz in Bulletin de l'Academie Imperiale des Sciences de St. Petersbourg, volume 19, page 250, under the name *Ribes grossularioides*. However, Steudel in 1821 had published the same name, *Ribes grossularioides*, in his Nomenclator Botanicus, page 691, for an American species, attributing the name to Michaux, who evidently had used it as a manuscript or herbarium name but had never himself published it. This older publication of the specific name *grossularioides*, in 1821, invalidates the later use of the name *grossularioides* for any other species and it becomes necessary, therefore, to give the Japanese species a new name. In allusion to the persistence of the dried corolla on the mature fruit, the name *Grossularia* **marcescens** is here proposed as a substitute for the invalid name *Ribes grossularioides* of Maximowicz. The gooseberries are regarded as constituting by themselves a genus, *Grossularia*, distinct from *Ribes*, which comprises the currants. —*Frederick V. Coville.*

PHACOCHŒRUS AS THE GENERIC NAME OF THE WARTHOGS.

When the validity of a name which has been in universal use for a long period is assailed, it is above all things important that the arguments against its status should be definite and absolute, and not be open to personal divergences of opinion.

Now I hold that the case against *Phacochœrus*, as published by Doctor Lyon in the General Notes for June* is not strong enough to warrant our giving up so well known a name. In the first place the fact that it was printed *Phaco chœrus* by Cuvier no doubt influenced Doctor Lyon, but an examination of the other similar footnotes in the Règne Animal shows that such notes were printed indiscriminately joined up, hyphenated or separate (*Dasyprocta*, *Arcto-mys*, *Hydro chœrus*) so that no stress can be laid on the printing of an individual name. Then we have not to deal with what Cuvier meant to do, but what he did do, and he certainly published the Latin name *Phaco chœrus* in connection with the warthogs. Merely to give the explanation of the French Phaco-chœres he should have given the Greek words—as indeed he did in other cases, e. g. "*ὑψιπρυμνὸς*." Finally Doctor Lyon quotes Fischer as the "first reviser," and if we take him as such, we may say that in referring to "*Phacochœrus* F. Cuv. apud. G. Cuv." as a validly formed name, even though synonymous with that given by him (for which he unjustifiably claimed three years priority) he accepted its standing as such, an acceptance there is not sufficient reason for us to refuse. I am not denying the probable correctness of Dr. Lyon's interpretation of Cuvier's meaning, but I claim that technically there is not sufficient reason to make of *Phacochœrus* another candidate for a place in the Fiat list. —*Oldfield Thomas.*

* Proc. Biol. Soc. Wash., vol. 28, p. 141.

NOTE ON A NEW ZEALAND GRASS.

Torresia fraseri (Hook. f.).

Hierochloë fraseri Hook. f. Fl. Antarct. 1: 93. 1844.
Savastana fraseri Skeels, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 248: 21. 1912.

This species is a native of New Zealand and Tasmania. It has been referred to *Torresia redolens* (Forst.) Roem. & Schult. (*Hierochloë redolens* R. Br.) but differs in its smaller size, more slender culms and smaller spikelets.

Seeds of this grass were sent to the U. S. Department of Agriculture by Dr. A. H. Cockayne, of Wellington, New Zealand. They were referred to me with the request that I designate the name the species should bear in the forthcoming Inventory of Seeds and Plants Imported. I have recently published * a note upon *Torresia* Ruiz. & Pav., showing it to be the earliest tenable name under the American Code for the species included under *Savastana* and *Hierochloë*, and transferring to it the North American species of the genus. Besides the New Zealand species under consideration there are six or eight other species of the southern hemisphere that should be placed under *Torresia* but the validity of each name should be investigated before the transfer is made.

—*A. S. Hitchcock.*

A NOTE ON THE OCCURRENCE OF EPIPERIPATUS IMTHURMI (SCLATER).†

Mr. Gilbert E. Bodkin, the Government Economic Biologist for British Guiana, has recently sent me five specimens of *Epiperipatus imthurmi* (Sclater) which he collected in June, 1915, at the Government Rubber Station, Issororo, Northwest District, British Guiana.

The specimens vary from 32 mm. to 47 mm. in length, and in width from 3 mm. to 4 mm.; four have 30 pairs of ambulatory legs, and the fifth has 31.

Mr. Bodkin writes: "I discovered them beneath rotten stumps of wood in a lowlying piece of soil at the foot of a hill at the Government Rubber Station, Issororo. The soil here is composed of about five feet of humus overlying clay, and is planted with trees of *Havea braziliensis* now about six years old. Only stumps in an advanced stage of rottenness were inhabited by these creatures. I found them to be common in this piece of land and secured about fourteen specimens in half an hour; some stumps harboured three or four specimens. I could easily have collected three times the number. Their colour when alive was a beautiful velvety chocolate brown above and a delicate flesh pink on the ventral surface."

—*Austin H. Clark.*

* Amer. Journ. Bot. 2: 300. 1915.

† Published with the permission of the Acting Secretary of the Smithsonian Institution.

NOTE ON THE GENERIC NAME BOLBORHYNCHUS BONAPARTE.

As originally proposed in Comptes Rendus, XLIV, 1857, p. 596, this name is a pure *nomen nudum*, and recent authors have turned to Souancé, Icon. Perroquets, 1857, for the purpose of determining the type species, which has been fixed as *Arara aymara* D'Orbigny. The genus has been recently subdivided by Mr. Ridgway,* who has retained the name *Bolborhynchus* (by inference) for *aymara*, and created three additional genera, *Grammopsittaca* (type, *Psittacula lineola* Cassin), *Nannopsittaca* (type, *Brotogerys panychlorus* Salvin and Godman) and *Psilopsiagon* (type, *Trichoglossus aurifrons* Wagler).

Unfortunately for nomenclature, Bonaparte introduced some additional matter in the author's separately paged reprint † of this paper, which is, in fact, a combination of two papers from the Comptes Rendus and has priority over Souancé's work. Here we find (p. 6) *Bolborhynchus* as a valid name, with two ostensible species, *Myiopsitta tigrina* Souancé,‡ and *Myiopsitta catharina* Bonaparte, both now synonymized under *Bolborhynchus lineolus* (Cassin). The species *aymara* is not mentioned, hence the type must become one of the two forms noted above. I accordingly designate *Myiopsitta catharina* Bonaparte (= *Psittacula lineola* Cassin) as type, since *M. tigrina*, said to be from Venezuela, may prove to be different. It follows that *Grammopsittaca* Ridgway is a pure synonym of *Bolborhynchus*, and that *aymara* is without a genus. For this species I propose the generic term **Amoropsittaca** § (type, *Arara aymara* D'Orbigny). —*Chas. W. Richmond.*

NOTE ON CHLOROSTILBON PURUENSIS.

In these Proceedings,‖ I described a hummingbird as *Chlorostilbon puruensis*. Shortly after the description was published I became convinced that I had placed the bird in the wrong genus. I was led astray by its resemblance to *Chlorostibon prasinus*, an aberrant member of the genus *Chlorostilbon*. My bird really belongs to the genus *Chlorestes* and is close to *Chlorestes cæruleus*, but not quite the same. The chin is not quite so blue and the bill is longer. Seven adult males of *Chlorestes c. cæruleus* from Bahia and the lower Amazon have the culmen, 15.5–17 (16.5) against 18 and 19.5 for my *C. puruensis*. In view of the above facts, the combination *Chlorestes cæruleus puruensis* will better express the relationship of the bird described by me. —*J. H. Riley.*

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* Proc. Biol. Soc. Washington, XXV, 1912, p. 100.

† The reprint is entitled "Remarques à propos des Observations de M. Émile Blanchard sur les Caractères ostéologiques chez les Oiseaux de la famille des Psittacides, et Tableau des genres de Perroquets disposés en séries parallèles," pp. 1–9; published in March, 1857. It may be added that the genera *Primolius* and *Ptilosclera* are valid from this reprint (*nomina nuda* in the original paper), and the name *Ognorhynchus* occurs for the first time. The latter will replace *Gnathosittaca* Cabanis, 1864 (= 1865).

‡ Revue et. Mag. de Zool., 1856, p. 141.

§ ἄμορος, unlucky; ψιττάκη, a parrot.

‖ XXVI, 1913, 63.

THE SPECIFIC NAME OF THE STRIPED MUISHOND OF SOUTH AFRICA.

In 1906 Howell * called attention to the fact that the specific name *striata* then in use for the striped muishond of South Africa referred in reality to a species of *Spilogale*, and he proposed that the African animal be called *Ictonyx capensis* (Smith).† It now comes to light that the Cape muishond was independently named *Bradypus striatus* in 1810 by Geo. Perry,‡ and as this name is not preoccupied by the *Viverra striata* of Shaw, 1800, which is a species of *Spilogale*, the South African striped muishond must be called *Ictonyx striatus* (Perry). The animal from which Perry's plate was drawn was exhibited alive in London and was doubtfully reported to have been found in South America, but there is no question as to its identification with the Cape form of *Ictonyx*.

—*N. Hollister.*

* Proc. Biol. Soc. Washington, vol. 19, p. 46. February 26, 1906.

† Descriptive Cat. S. African Mus., p. 20. 1826.

‡ Arcana or The Museum of Natural History, pt. 11, pl. [41] and text. p. [1]. November, 1810. I am indebted to Dr. C. W. Richmond for the opportunity to see this volume. The text and plates are not numbered; title page dated 1811.

INDEX

New names are printed in **heavy type**

A

Achyranthes **ingramiana** 87
Admontiopsis 19
Æolothripoidea 56
Aequidens cæruleopunctatus 154
Aëtobatus narinari 94
Allen, A. A. The Birds of a Cat-tail Marsh xi
Allen, G. M. The Water Shrew of Nova Scotia 15–18
Alophoropsis 20
Alopias vulpes 91
Alosa sapidissima 12
Alsophis **sanctonum** 78
Amazona **gracilipes** 106
Ambloplites rupestris 12
Ameiurus catus 9
natalis 10
nebulosus 9
Amobiopsis 20
Amoropsittaca 183
Andropogon **abyssinicus** 39
anatherus 28
cordofanus 39
drummondii 42
effusus 35
eichengeri 33
exiguus 32
halepensis 25
hewisoni 41
leiostachyus 28
milliformis 28
muticus 29
niloticus 41
propinquus 29
siamensis 30
sorghum 25
sudanensis 33
verticilliflorus 37
vogelianus 34
Anguilla rostrata 11
Anolis **antiquae** 74
marmoratus 76
terræ-altae 76
Appendicula 145
Appendicularia 145
Ara **mexicana** 106
Aratinga **occidentalis** 81
Archius fluviatilis 153, 159
Arctophyto 22
Asturina **pallida** 170
Astyanax fischeri 152, 155
grandis 152, 155
mucronatus 155
Ateles **darlensis** 101
neglectus 142
Atherina aræa 151, 157
Attila **arizeleus** 169

B

Bailey, V. Remarks on Gray Squirrels xi
—— Notes on Variation, Distribution, and Habits of the Pocket Gophers of the Genus *Thomomys* . xi
Ball, E. D. New Genera and Species of Acocephalinæ 165–168
Bangs, O. Three New Subspecies of Birds from Eastern Mexico and Yucatan 125–126
Barbour, T. Recent Notes Regarding West Indian Reptiles and Amphibians 71–78
—— A New Snake from Southern Peru 149–150
Bartsch, P. Remarks on Red-headed Woodpeckers in Grounds of Freedmen's Hospital xi
—— Remarks on Gray Squirrels . . xi
—— The Status of the Tunicate Genera *Appendicularia* and *Fritillaria* 145–146
Bivibranchia protractila 154
Bodianus acanthistius 153, 158
Bolborhynchus 183
Boleosoma effulgens 13
olmstedi 13
Bombyliopsis 23
Brachyspiza **hypoleuca** 79
Bramocharax bransfordii 156
Brycon dentex 154
Bush-Brown, H. K. The Evolution of the Horse x

C

Calliphoropsis 22
Campostoma anomalum 10
Canis azarae 142
gymnocercus 143
Carcharhinus acronotus 90
lamia 90
limbatus 90
Carcharias littoralis 91
Carcharodon carcharias 91
Carclnomyia 21
Carpiodes cyprinus 10
Catostomus commersonii 10
Cetorhinus maximus 92
Chaenobryttus gulosus 12
Chaetocrania 23
Chaetonopsis 21
Chalinolobus tuberculatus 69
Chase, A. Developing Instincts of a Young Squirrel ix
Chironomus **macateei** 45
Chlorestes puruensis 183
Chlorœnas **exigua** 177
exsul 106

Chlorostilbon puruensis 183
Chlorotachnia 21
Chonophorus nelsoni 153
Chordeiles acutipennis 176
virginianus 175, 176
Chromatocera 21
Chrysorutilia 23
Citharichthys spilopterus . . . 152, 153, 159
Clark, A. H. A Note on the Occurrence of *Epiperipatus imthurmi* (Sclater) 182
Cnephaliops 23
Coccyzus **palloris** 105
rileyi 105
Cockerell, T. D. A. Scales of Panama Fishes 151–160
Coles, R. J. Notes on the Sharks and Rays of Cape Lookout, N. C. . . 89–94
Colinus **taylori** 103
Columba **proxima** 170
Compsothraupis 180
Connochætes 69
Conurus **strenuus** 106
Cooke, W. W. Reading of letter from Dr. B. W. Evermann x
Coryphistera **campicola** 170
Coville, F. V. *Grossularia marcescens* 181
Crax **annulata** 170
Curimatus magdalenæ 152, 156
Cyanocompsa **benepiacita** 126
Cymopolia 180
Cynopotamus argenteus 156
Cyprinus carpio 10
Cystogonia 21

D

Dactylagnus mundus 152, 159
Dasyatis hastata 93
say 93
Dearborn, N. Notes on the Breeding of Minks in Captivity xi
Desmothrips 57
Doolittle, A. A. Mississippi River Dam at Keokuk, its Effect on Biological Conditions, Especially those of the Plankton xiii
Dorosoma cepedianum 11
Drionia nigra 167
Drymobius boddaerti 77
Drymophila **hellmayri** 80
Dryocopus **silvifragus** 162
Dunn, E. R. The Variations of a Brood of Watersnakes 61–68

E

Election of officers for 1916 xiv
Eleotris pisonis 153
Eleutherodactylus lentus 71
Eoglaucomys 109
Eohyria 23
Eophona **sowerbyi** 163
Epiperipatus imthurmi 182
Ericymba buccata 11
Erimyzon oblongus 10
Erionotus **subcinereus** 80
Esox reticulatus 12
Etheostoma flabellare 13
Euadmontia 19
Euaraba 20
Eucinostomus californiensis 153
Eufabriciopsis 22
Euhilarella 22
Euhyperecteina 19
Euphasiopteryx 23
Euphorantha 20
Eureodon 141
Euscarthmus **olivascens** 169
Eusenotainia 22
Eutricogena 23
Euzelia 23
Exoglossum maxillingua 11

F

Figgins, J. D. Diagnosis of a New Marmot from Colorado 147–148
Fleming, J. H. A New *Turnagra* from Stephens' Island, New Zealand, 121–123
Formicarius **virescens** 80
Fritillaria 145
Fritillum 146

G

Galeocerdo tigrinus 89
Garner, R. L. African Studies: Things in Common among Men, Apes, and other Mammals xii
Gastropeleucus maculatus 152, 155
Geomys **tropicalis** 134
Gerres rhombeus 152, 158
Gidley, J. W. Notes on the Possible Origin of Bears x
Gilmore, C. W. Observations on New Dinosaurian Reptiles xii
Ginglymostoma cirratum 89
Glaucomys **bullatus** 113
canescens 111
columbiensis 113
flaviventris 112
latipes 112
saturatus 110
texensis 110
Gobius claytoni 153
soporator 153
Goliathocera 21
Goldman, E. A. Biological Explorations in Eastern Panama xi
—— A New Spider Monkey from Panama 101–102
—— Five New Rice Rats of the Genus *Oryzomys* from Middle America 127–130
—— Five New Mammals from Mexico and Arizona 133–137
Grallaria **carmelitæ** 81
Grammopsittaca **maculata** 106
Grossularia **marcescens** 181

H

Hay, O. P. On a North American Specimen of *Nothrotherium* xi
—— A New Pleistocene Sloth from Texas xiii
—— Exhibition of a Fossil Walrus xiii
Hay, W. P. An Albino Diamond-back Terrapin ix
Herpetodryas carinatus 77
Herpsilochmus **nigrescens** 80
Hitchcock, A. S. The New Flora of the District of Columbia x
—— Collecting Grasses in the Southwest xii
—— Note on a New Zealand Grass . 182
Hjort, J. On Norwegian Herring Catches ix
Hollister, N. The Type Locality of *Pecari tajacu* 70
—— A New Name for the White-tailed Jack Rabbit 70
—— The Systematic Name of the Mexican Spider Monkey 142
—— The Specific Name of the Striped Muishond of South Africa . 184

Homalactia 21
Hood, J. D. Some Features in the Morphology of the Insect Order Thysanoptera xi
—— A Remarkable New Thrips from Australia 49–51
—— An Outline of the Subfamilies and Higher Groups of the Insect Order Thysanoptera 53–60
Howard, L. O. On Meetings of the American Association for the Advancement of Science ix
—— Discussion of the Mosquito Campaign in New Jersey x
—— On a Curious Wasp's Nest . . . xi
—— Novel Breeding Habits of Certain Mosquitoes in Mountains of New York xi
—— Exhibition of Pictures of *Ceratomia amyntor* xii
—— Observations on Mosquitoes and House Flies xii
—— Some Biological Pictures of Oahu (Hawaii) xiii
—— Remarks on the Cluster Fly . xiii
Howell, A. H. Descriptions of a New Genus and Seven New Races of Flying Squirrels 109–113
Hybognathus nuchalis 10
Hybopsis kentuckiensis 11
Hypentelium nigricans 10
Hypolophus **phainoleucus** 80
Hyoprion brevirostris 90
Hyporhamphus unifasciatus . . . 152, 157

I

Ictalurus furcatus 9
punctatus 9
Ictonyx capensis 184
striatus 184
Iresine **rhizomatosa** 172
Ischyrophaga 23

J

Jacquinotia 142
Jurinodexia 22

K

Knab, F. The Dispersal of Some Species of Flies xiii
—— Two New Species of *Pipunculus* 83–86

L

Leimadophis **andicolus** 149
Lepomis auritus 12
cyanellus 12
gibbosus 13
solis 13
Leptodactylus albilabris 72
Leptotila **nuttingi** 107
Leptotyphlops bilineata 77
Lepus **campanius** 70
campestris 70
sierræ 70
townsendii 70
Leuciscus vandoisulus 11
Lincoln, F. C. Description of a New Bob-white from Colorado 103
Luciocharax insculptus 155
Lyon, M. W., Jr. Notes on the Physiology of Bats ix
—— *Endamœba gingivalis* and Pyorrhea xi
Lyon, M. W., Jr. Remarks on Red-headed Woodpeckers in Grounds of Freedmen's Hospital xi
—— *Eureodon* as the Generic Name of the Warthogs 141
—— *Macaca* versus *Pithecus* as the Generic Name of the Macaques . . 179

M

Macaca 179
Malloch, J. R. Four New North American Diptera 45–48
Manta birostris 94
Marmota **campioni** 147
McAtee, W. L., and Weed, A. C. First List of the Fishes of the Vicinity of Plummers Island, Maryland . 1–14
Megapariopsis 22
Melinocera 22
Melopelia **mearnsi** 107
Menticirrhus martinicensis 153
Meoneura **nigrifrons** 47
Merrill, E. D. Geographical Relationships of the Philippine Flora . . xiii
Metapenæus **mobilispinis** 117
Metopotachina 21
Metrioenemus **annuliventris** 46
Micropterus dolomieu 13
salmoides 13
Microrutilia 23
Miller, G. S., Jr. A New Squirrel from Northeastern China 115–116
Mobula ölfersi 94
Morococcyx **mexicanus** 105
Morone americana 13
Moxostoma macrolepidotum 10
Mustelus canis 89
Myeteroperca xenarcha 153
Myliobatis freminvillei 94
Myoceropsis 23

N

Narcine brasiliensis 93
Natrix sipedon 61
Nelson, E. W. Remarks on the Bat Roosts at San Antonio, Texas . . . xii
Neohypostena 22
Neosorex **acadicus** 15
Neotoma **mearnsi** 135
sheldoni 136
Nionia 165
Noctilio **mexicanus** 136
Notemigonus crysoleucas 11
Notiœnas 106
Notropis amarus 11
amoenus 11
analostanus 11
arge 11
cornutus 11
photogenis 11
procne 11

O

Oberholser, H. C. A Naturalist in Nevada x
Oberholseria 180
Ocypterosoma 19
Odontorchilus 180
Odontoscion dentex 154
Œnœnas **chiroquensis** 139
Opisthonema libertate 151, 156
Opisthopterus dovii 152, 156

Oppiopsis 20
Opsodexia 20
Opsophasiops 22
Opsophyto 23
Oreotriccus 180
Orthopristis chalceus 154
Orthostœchus maculicauda 154
Oryzomys **alleni** 128
darlensis 128
guerrerensis 127
lenis 130
regilius 129
Osgood, W. H. The Name of Azara's Agouarachay 142
Oxexorista 21

P

Palicus 180
Palmer, T. S. Notes on the Importation of Foreign Birds xi
Palmer, W. An Unknown Fossil . . . ix
—— Exhibition of Tongue of a Sulphurbottom Whale x
—— On a European Skylark in Virginia xii
—— Exhibition of the Jaws of a Ray xii
—— The Basic Facts of Bird Coloration xii
Panopeus **boekei** 118
Paragymnochaeta 21
Paralichthys woolmani 152, 159
Paraliispidea 20
Paralonchurus dumerili 154, 158
Paranthias furcifer 153, 158
Paraphasia 20
Paraphorantha 20
Pecari tajacu 70
Penelope **speciosa** 82
Perca flavescens 13
Percopsis omiscomaycus 12
Petrometopon panamensis 153, 158
Petromyzon marinus 9
Phaeochœrus 141, 181
Phalacrodexia 21
Phalacrophyto 23
Phasiomyia 20
Pheugopedius **cognatus** 80
Philypnus maculatus 153
Phlœothripoidea 58
Phœthornis **subochraceus** 170
Phoranthella 23
Phyliophila 21
Phytopsis 20
Piabucina panamensis 152, 155
Pierce, W. D. The Uses of Weevils and Weevil Products in Food and Medicine xii
Pilsbry, H. A. On Certain Aspects of Hawaiian Land Shell Problems . . ix
Pimephales notatus 11
Pionus **saturatus** 81
Piper, C. V. *Andropogon halepensis* and *Andropogon sorghum* 25–44
Pipunculus **industrius** 83
vagabundus 84
Pithecus 179
Pœcilia sphenops 152, 156
Pomadasis bayanus 154
macracanthus 154
Pomoxis annularis 12
sparoides 12
Potos **guerrerensis** 133
Pristis pectinatus 92
Protodejeania 21
Psammoppia 20
Pseudothelphusa **angulata** 98
clausa 98
pearsei 95
ruthveni 100
Psittacula **cyanophanes** 81
Pteroplatea altavela 93
maclura 93
Pygothripidæ 49
Pygothrips rugicauda 49, 50
Pyrrhura **australis** 82

Q

Quaintance, A. L. Remarks on Some Little-known Insect Depredators . xii

R

Radcliffe, L. Remarks on the Rearing of Shad in Ponds xiii
Raja eglanteria 92
lævis 92
Ransom, B. H. On a New Biological Journal Devoted to Animal Parasites x
Rathbun, M. J. New Fresh-water Crabs (*Pseudothelphusa*) from Colombia 95–100
—— New Species of Decapod Crustaceans from the Dutch West Indies 117–120
—— *Jacquinotia*, a New Crab Name 142
—— *Cymopolia* versus *Palicus* . . . 180
Rhinichthys atronasus 11
cataractae 11
Rhinobatus lentiginosus 29
Rhinoptera bonasus 94
Richmond, C. W. Notes on Several Preoccupied Generic Names (Aves) 180
—— Note on the Generic Name *Bolborhynchus* Bonaparte 183
Ridgway, R. Descriptions of Some New Forms of American Cuckoos, Parrots, and Pigeons 105–107
—— A New Pigeon from Chiriqui, Panama 139–140
—— A New Pigeon from Jamaica . 177
Riley, J. H. Descriptions of Three New Birds from China and Japan 161–164
—— Note on *Chlorostilbon puruensis* 183
Roccus lineatus 13
Rœboides guatemalensis 151, 156
Roeseliopsis 23
Rose, J. N. Botanical Explorations in South America . . . . . x, xiii
—— Exhibition of Brazilian Hummingbird Nests xii
Rutilodexia 23
Rypticus nigripinnis 151, 157

S

Salminus maxillosus 156
Salvelinus fontinalis 12
Sapromyza **littoralis** 47
Satanoperca crassilabris 154
Schilbeodes insignis 10
Schizodon fasciatus 154
Scoliodon terræ-novæ 90
Semotilus atromaculatus 10
corporalis 10
Setopagis **heterurus** 81
Spathimeigenia 19
Sphaerodactylus fantasticus 72
festus 73
macrolepis 72

Sphyrna tiburo 90
zygæna 90
Sporophila **hypochroma** 79
Squalus acanthias 92
Squatina squatina 92
Standley, P. C. A New Species of *Achyranthes* from Tobago 87–88
—— A New Species of *Iresine* from the United States 171–173
Stejneger, L. A New Species of Tailless Batrachian from North America 131–132
Stellifer colonensis 154
Stiles, C. W. On Blood Examinations of Children xii
—— On Generic Names of Birds . . xii
Stizostedion vitreum 13
Symphurus plagusia 153
Synodus evermanni 152, 156
Syrrhophus **campi** 131

T

Tamiops **vestitus** 115
Tetrastes **vicinitas** 161
Thermochalcis 180
Thomas, O. Determination of *Vespertugo vagans* Dobson from "Bermuda" 69
—— The Generic Name *Connochætes* of Lichtenstein 69
—— *Phacochœrus* as the Generic Name of the Warthogs 181
Thripoidea 57
Thysanoptera 53
Tityra **deses** 125
Todd, W. E. C. Preliminary Diagnoses of Apparently New South American Birds 79–82
—— Preliminary Diagnoses of Seven Apparently New Neotropical Birds 169–170
Torresia fraseri 182
Townsend, C. H. T. Two Years' Investigation in Peru of Verruga and its Insect Transmission xii
—— Identification of the Stages in the Asexual Cycle of *Bartonella bacilliformis*, the Pathogenic Organism of Verruga, and their Bearing on the Etiology and Unity of the Disease xiii
Townsend, C. H. T. Proposal of New Muscoid Genera for Old Species . 19–21
Trichocalliphora 20
Trochilodexia 22
Turdus **phillipsi** 125
Turnagra capensis 122
minor 121
Tylosurus scapularis 151, 157
Typhlops lumbricalis 77

U

Uhleriella **pasadena** 166
ziczac 166
Upeneus maculatus 153, 157
Urolophus jamaicensis 93
Urothripoidea 59

V

Vaughan, T. W. Remarks on the Rate of Growth of Stony Corals x
Vesperugo vagans 69

W

Weed, A. C., and McAtee, W. L. See McAtee, W. L.
Wetmore, A. Notes on the Habits of the Duck Hawk xiii
—— An Anatomical Note on the Genus *Chordeiles* Swainson . . 175–176
Wilcox, T. E. Inquiries Concerning the Color of the Eyes in Certain Turtles x
—— A Cedar of Lebanon in Lafayette Square xi
Wright, A. H. The Snakes and Lizards of Okefinoke Swamp xi

X

Xanthocera 22
Xenadmontia 22
Xenoppia 20
Xiphophorus helleri 153, 156

Z

Zenaida **robinsoni** 107
Zenaidura **tresmariæ** 107

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